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ABSTRACT

Using the premise that one of society's most pressing educational needs is the preparing of personnel to implement and facilitate environmental education programs in schools, teacher preparation institutions, and other educational agencies, the conference focused on identifying "what to do" and "how to do it." Speakers discussed problems to be encountered in developing and maintaining environmental education programs, as well as how to design approaches for alleviating these problems. Content is divided into five areas: Developing Master Plans for Environmental Education (Planning Guidelines, Federal Planning and Coordination, Action to be Implemented in New Jersey, and Critical Factors); Dimensions of Environmental Education Programs (Curriculum Organization, Environmental Influences on Human Behavior, Human Values, and Education as Environment); Resources for Environmental Education (Allocating Resources, Environmental Management Education, Alternatives for Demonstrating that Mother Earth is a "Crocogator," and The Environmental Science Center); Community Environmental Education (Community Interaction, Environmental Education for the Total Community, The Business Community, and A School and Some Volunteer Organizations); and the Workshop in Retrospect: A Summary (Planning the Program, Guidelines for Curriculum Development, Future Directions, and Community Environmental Education). (BL)

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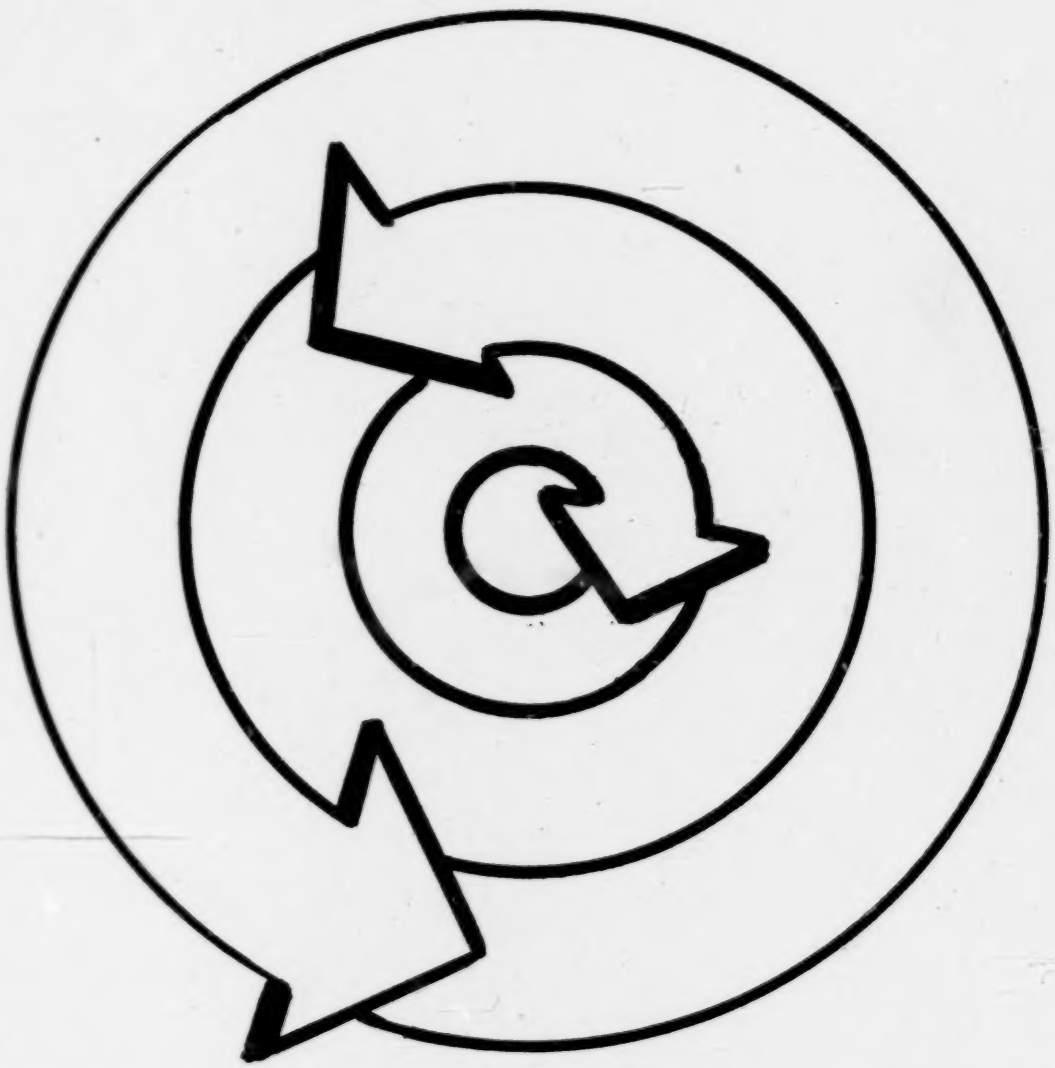

PLANNING PRIORITIES

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ENVIRONMENTAL EDUCATION: PLANNING PRIORITIES

Proceedings of the Environmental Education Workshop
for Teachers and Teacher Trainers

at

Madison, Wisconsin

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Edited by

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INTRODUCTION

One of society's most pressing educational needs is the preparing of personnel to implement and facilitate environmental education programs in schools, teacher preparation institutions, and other educational agencies. While some conservation and outdoor education programs have been implemented for many years, existing programs have not generally possessed the characteristics of forward-looking environmental education programs: They have not dealt with science, social studies, politics, economics, and aesthetics as interdependent aspects of the area.

Previous workshops and surveys have revealed two prominent deficiencies inhibiting development of effective environmental education programs. These were the absence of appropriate curricular materials and the lack of teacher preparation. In spite of these barriers, however, teachers in public and private schools don't lack enthusiasm for becoming involved in environmental education activities. In fact, many people are ready to initiate new programs or modify old programs to include environmental education in the curriculum. But, these instructional personnel need assistance to implement and facilitate such programs. Evidence of this need is reflected in the questions being asked educators all over the country. Such questions as:

1. What does a program of environmental education consist of? To what extent do we as teachers get involved in the social, political, and economic aspects of these problems?
2. What materials are available for utilization in local programs? How do we utilize these materials?
3. Where can we obtain information and professional assistance to help initiate programs?
4. Where can we get research evidence related to the various problem areas such as air and water pollution?
5. Is it feasible and/or advisable to have a separate program in environmental education? If not, how can we incorporate this study into existing curricula or employ existing curricula to facilitate the goals of environmental education?
6. What can we do to lobby for more support for these needs? How do we secure improved articulation between parties concerned about these and related problems?

This workshop responded to this need through a series of activities specifically designed to stimulate the implementing and sustaining of environmental education programs. Workshop participants were drawn from within Region V of the Office of Education. This region comprises states in the Great Lakes region which gives program developers an opportunity to build environmental education programs around common regional problems within a broader national and international perspective.

The Conference Focus

Since conference participants were already aware of existing environmental problems, sessions were devoted to identifying "what to do" and "how to do it." To facilitate the most productive workshop sessions, students, teachers, administrators, teacher educators, citizens, scientists, social scientists, and representatives of industry were included to represent the many facets of environmental problems--from creation to alleviation (including prevention and correction). The intent was to maximize a positive environmental problem-solving potential to combat often-prevalent feelings of negativism based on ignorance, fear, and lack of communication.

Thus, the program stressed cooperative planning and action by facilitating communication between and among concern parties.

Major objectives included:

1. To bring the participants up-to-date on the state of art.
2. To reinforce an appreciation of the scope and depth of the problem; e.g., to illustrate the interrelationships between science, social studies, economics, politics and aesthetics as they pertain to environmental education.
3. To extend the participants' horizons of environmental education as a phenomenon which extends beyond the domain of the conventional classroom; i.e., to assist in the development of a philosophy of community environmental education.
4. To provide clear-cut guidelines for future action at the local, district, state, regional, national, and international levels, including the identification and delineation of problems and the identification and preparation of leaders in the field.
5. To stimulate the design of action-oriented activities for students in schools and teacher preparation institutions, including involvement with non-school groups and institutions.
6. To send the participants home with ideas and materials in hand for implementing and facilitating programs of environmental education.
7. To provide business and industry with the opportunity to explain what action they are taking to alleviate problems.

Program Overview

The workshop was designed to provide opportunities for participants to work together and discuss problems they would encounter in developing and maintaining environmental education programs, as well as to design approaches for alleviating these problems. Specialists from a variety of

fields related to environmental education identified and clarified basic issues and problems inherent in environmental education program activities. Each speaker gave his perspective of the interrelationships of his problems with those problems confronting others. Speakers also drew implications for teachers and those responsible for teacher preparation, most suggestions being related to "What can be done?" Approaches based on creating defenses against "unjust accusations" were discouraged. Discussions following this kind of presentation provided opportunities for a variety of business and educationally-oriented persons to share their perceptions of problems, and articulate difficulties they experience in becoming more environmentally responsive and responsible.

A second type of presentation, less formal than the previous type, was the case study. Such presentations were specifically designed to answer the question, "What is working where?" Persons making these presentations gave evidence of their successes and failures in the many and varied aspects of environmental education. These case studies helped pinpoint those things which had enhanced, as well as hindered, program development. Selection of case studies was restricted primarily to programs which considered environmental education from a broad perspective and involved students and teachers alike in the societal aspects of alleviating environmental problems. The case studies were also action-oriented. By including presentations of this nature in the workshop activity, beginners and "experts" alike profited from the work of others.

Following formal presentations and related discussion, small groups were constituted to work on specific questions pertinent to creating means for providing environmental education. These groups were to produce concrete recommendations that they could implement as well as readily disseminate to others not attending the workshop. (Those recommendations were communicated between groups primarily by word of mouth, with most dissemination occurring after participants returned to their home. This dissemination pattern was facilitated by the geographically-specific selection procedure.)

Some of the questions discussed by participants included the following:

1. What is a suitable working definition for environmental education?
2. What constitutes an appropriate program of education studies for students in the schools and teacher preparation institutions?
3. How do we get involved? How do we initiate programs in environmental education?
4. What are the implications of environmental education for curriculum design? What kinds of interdisciplinary procedures and activities can be initiated; e.g., what kinds of joint science and social studies efforts can be initiated?

a. What kinds of curricular and extra-curricular activities can students of all ages be engaged in to acquire an understanding of environmental problems? (Emphasis is to be placed on identifying action-oriented activities that the target groups--elementary and secondary students, adults, teacher educators--can bring to fruition rather than those which could produce frustration and an ultimate "turn-off.")

b. What kinds of curricular and extra-curricular activities can pre-inservice and in-service teachers be engaged in to help them learn how to facilitate environmental education? (While the bulk of the effort would be concentrated on educating students in K-12 situations, some deliberation would be given to adult education, vocational-technical education, and other higher education to eliminate a restricted viewpoint of environmental education and promote a recognition that environmental education should be a total educational effort. Co-operation and communication are necessary at all levels.)

5. What cautions must we exercise in designing programs of environmental education so that we do not "kill" the movement before it ever really begins--emotional aspects, safety, administration, legal aspects?

6. How do we identify community problems and evaluate the magnitude of the existing conditions?

7. What are appropriate learning environments for promoting environmental education other than the traditional outdoor facility? How do we identify and evaluate such potential areas?

8. How can we make our programs of environmental education problem-centered?

9. What should be the nature and design of new curriculum materials?

10. Do we need new institutions for preparing educational personnel in environmental education? If so, what should they be like? Should they provide the opportunity for students, teachers, teacher educators, citizens, and business and industrial representatives to study and learn together? How could programs in these institutions provide for maximizing a multiplier effect?

11. What can we do to coordinate intra- and interstate planning?

Consideration was given to common needs of all involved groups and to unique needs of different groups (such as students in rural and urban situations). These local similarities and differences were always considered within the context of a broader regional perspective. And, of course, this regional perspective was considered within the framework

of a national and international perspective. Participants could shift between and among the small groups so that individuals could deal with a wide variety of people on a multitude of questions.

Participants also brought samples of materials they were utilizing or developing for others to examine. Thus, many people had the opportunity to make appraisals of a wide variety of materials for use in their particular locale within the description of their program. Participants recognized that many existing materials might have use in a local situation with appropriate modifications.

Throughout the workshop, emphasis was placed on planning, cooperation, and communication. Continual education and re-education was stressed, both considered as activities of many agencies and institutions including the schools. The domain of environmental education was also expected to include the inner environment of man as well as natural and man-made environments.

Participants

Participants were selected from the six states (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin) included in Region V of the United States Office of Education. The group's location in the Great Lakes region provides a distinct opportunity for impact on common regional problems.

Selection procedures insured that each of the six states would have a team of representatives which would have maximum contact with people in their respective states. Participants were chosen who, because of their position and/or personal actions, would disseminate conference results, while maintaining and sustaining actions initiated by workshop participation. Participants also had high potential for maximizing local efforts.

Participants were carefully selected to represent the diversity of learning environments from rural to urban situations. A wide range of expertise was sought. The intent was to include both people involved in functioning environmental education programs and people who had not yet initiated any environmental education activities. This approach had a twofold advantage: Participants who were already engaged in developmental activities could provide insights into the catalysts and inhibitors to program development and maintenance. In addition, novices could raise questions that would provide impetus for modification of existing programs. Such questions could give the "experts" an opportunity to re-think what they were doing and re-examine the appropriateness of the actions they were taking. (See Appendix B for a list of participants.)

Note: For the most part, papers appearing in this volume were produced from audio tapes of talks given at the workshop. As such, they represent edited transcripts of remarks designed to be communicated verbally.

DEVELOPING MASTER PLANS

FOR ENVIRONMENTAL

EDUCATION

PLANNING GUIDELINES: AN OVERVIEW

The very nature of the environmental dilemma necessitates environmental education planning activity that allows for dealing with broad international perspectives. While initial efforts will have to be pertinent to local, regional, state, or national contexts, effective planning will require both a responsiveness and responsibility to the global perspective. Various activities can then be designed for entry at various levels, ranging from the international level to the very specific local level. No matter what the point of entry for these activities, however, "master" plans must guide programmatic efforts.

A master plan considers both local and global needs. The plan should both promote and require coordination and cooperation between involved parties. Such plans should also foster the creation of interactive communication patterns and make provision for continual institutional analysis. They should be organized in ways to draw on institutional strengths as well as recognize deficiencies so that efforts are productive. In all instances such plans would serve as guides, providing a system of checks and balances rather than being a means of enforcing prescriptions.

At a minimum master plan preparation must deal with two basic questions. These are (1) the philosophical orientation which establishes the overall purpose of activity and (2) the consideration of basic operations and day-by-day details for accomplishing the task. Of particular importance in plan development is the necessity of a conceptual framework with sufficient substance for specifying operational details. In fact, inherent weaknesses in current environmental education activities are the absence of master plans, and a sound foundation for building them. We are operating and specifying details too often and too fast for something we do not fully comprehend.

In addition to having plans which prevent limited scopes, there are other reasons for developing master plans. Not only are they mandatory for effecting cooperative and coordinated activities, but they are fast becoming a prerequisite for soliciting outside assistance. Thus, master plans are basic to organizing a productive effort as well as for the practical question of obtaining financial support.

Master plan development must consider certain basic factors. First, the plan must incorporate a procedure to allow a constant interaction of cognitive and affective dimensions (necessary for any broad environmental education program). The plan must facilitate efforts which permit and expect a study of man's behavior. Such a study would analyze life styles and their effect on the environment, and determine roles that values play in resolving environmental dilemmas while recognizing that the political process is also an

integral component. The plan must contain a programmatic effort to deal with key concepts such as interaction and interdependence. Such concepts provide an approach for understanding the "three environments of man." (See Figure 1.)

As indicated in Figure 1, environmental education's domain lies at the interface of man, the natural environment, and the man-made environment. Environmental education includes study of any and all interactions residing at this interface.

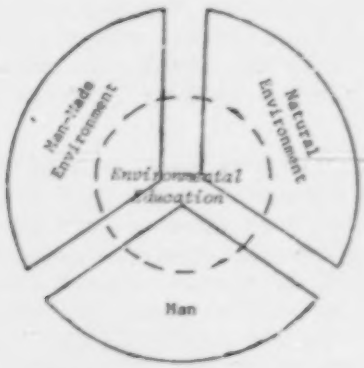

Figure 1. The Domain of Environmental Education

One means of organizing key concepts at the interface might be in terms of the four "laws" of ecology as popularized by biologist Barry Commoner.

1. "Everything is connected to everything else."
2. "Everything must go somewhere."
3. "Nature knows best."
4. "There's no free lunch."

Such a framework would imply that the analysis of the political process and the behavior of man must include consideration of both compromise and adherence to principle. Those in an environmental education program must recognize compromise as a useful approach in many instances, but, in terms of the four laws of ecology, there is a point of "no return." Principle must then take precedence over compromise.

The nature of problem solving should also be taken into account when specifying the content for environmental education programs. The main goal here is to place scientific knowledge and technological thinking within an appropriate environmental perspective. There are environmental problems where the symptoms are obvious and where we may "solve" such problems by correcting existing conditions. Such an approach puts out immediate fires but, more often than not, is not future-oriented. Therefore, problem solving must be expanded to seek out root causes, with subsequent prevention of future problems. This orientation requires attempts to change some values while challenging many existing values. In all instances, we must recognize the necessity of working at both preventive and corrective problem solving. We must further recognize that certain problems continue to reoccur, often in new contexts, and some environmental problems are never solved. Their

magnitude just lessens for short periods of time. These latter problems are to be studied in the preventive vein rather than from a short-term corrective outlook.

Master plans must recognize that the total environment is synonymous with the learning environment of program consumers. We are dealing with something far more comprehensive than planning courses and units of study. We are preparing a master plan to deal with a new educational philosophy that could pervade all present and future educational activities. If we only develop new textbooks, new units, etc., we serve to perpetuate the problem by dealing only with its symptoms rather than its causes.

Environmental education plans require action programs as the ultimate goal, programs concerned with alleviating problems rather than just studying them and looking at underlying theoretical and philosophical aspects. Plans should support positive, constructive, action-oriented approaches. While awareness is important, it is only the starting point for an effective environmental education program.

The ultimate in planning involves programs of action and involvement aimed at survival and quality of life. These programs are based on commitment to action rather than merely voiced concern. Such outcomes bring environmental education clearly into the arena of human rights. For example, what are the boundaries of an individual's rights within the confines of a society and a culture? If a person does not choose individual or collective action, are we faced with legislating environmental choices?

In planning for environmental education, a new role for education appears. In this framework, education accepts responsibility extending beyond knowledge development and the transmission of culture to a programmatic effort to consider man's inner environment, the natural environment, and the man-made environment.

The operations segment of master plans will guide specific local, managerial details. But again, these operations must be developed and analyzed in a broader--ultimately international context. There must be some allowance for learning by mistakes at all levels, but experience from the past can also mediate the present and future. Our new knowledge about procedure must work to our advantage rather than our demise.

Development of state master plans will require a total state commitment to cope with questions related to state concerns and available resources. While local agencies are both responsive and responsible to the local community, they also have an obligation to the broader state environment. Input will be needed from all groups represented under the umbrella of the plan, including government, education, and the community groups. Communication channels between all interested parties are necessary to cooperatively produce and support action programs. One technique is to establish coordinating councils that include representation from various groups with an interest and commitment to education. In so doing, we decrease competition among groups by involving them in a collective decision-making process. Of particular importance is that many citizens be

involved from the very beginning in developing an environmental education plan.

Another factor of importance in the planning effort is establishing reasonable expectations for change and rate of change. We are already faced with a backlash that has come from taking an excessive negative approach while often ignoring positive accomplishments. Planning must be long range, but the expectation should be for making progress in shorter steps.

Planners should recognize that environmental education, as many other educational efforts, is very much a political activity. Planners must carefully study the institutions within which they work, to use the power of these institutions to move the environmental education program forward. In the political arena some inhibitors of effective program development might be problems of coordination, the short-term interests of the power grabbers, unrealistic planning and taking a negative approach rather than a comprehensive, positive orientation.

Financially, while funds might come from somewhat unusual sources, recognize that dependence on outside money for starting a program is not necessary. Those with a real commitment to development will recognize the potential of reallocating available resources in a physical sense while developing new resources in a personnel sense to produce far more "funds" for program development than are needed.

FEDERAL PLANNING AND COORDINATION FOR ENVIRONMENTAL EDUCATION

I. Jack Fasteau, Deputy Director
Division of Program Resources
U.S. Office of Education

I. Jack Fasteau both explicitly and implicitly refers to factors worth considering when planning an environmental education program's overall structure. The major environmental problems are of international scope. The cost of correcting environmental problems is high, and is far more than costs of prevention efforts would have been. One inhibitor to progress in environmental education is the nature of our institutions for, in reality, environmental education is a societal problem. Problems of the environment will only be solved by a total commitment to making change and becoming environmentally responsible. In fact, the role of environmental education is not to develop new specialities, but rather to sensitize and broaden the perspective of existing disciplines towards the potential for interaction. Environmental education programs have the responsibility to consider at some length the issue of individual rights versus collective rights of the group and resulting legislative control. This necessitates an intensive study of power.

To carry out my assignment, I will present some basic facts on environmental control, some steps being taken to achieve it, attempt to define the role of the Office of Education in this area and try to answer some of the questions that Dr. Voelker posed for me. Because of time limitations, I will be able to touch only lightly on some of these areas. Each of them, to be dealt with in depth would take days of discussion.

I'll start with this rather drastic statement. The rate of pollution is in direct proportion to the standard of living. It follows that the rate of pollution per person in our country, with the highest standard of living is larger than the rate of pollution per person in any other country in the world. For example, it has been estimated that the rate of pollution per child in this country is about 80 times greater than the rate of pollution of a child in India. The obvious reason for this is that a child living in India, with its abysmal standard of living has very few things, practically nothing that pollutes.

It has been further estimated that if everyone in the world consumed and polluted at the United States per capita rate, the

earth would be able to support only 600,000,000 people. The world now has over three billion people, with a projected population that by the year 1980 of four billion. The significance of these facts are self-evident.

Industry and the by-products of industry--our industrial wastes--are responsible for two thirds of pollution in this country. Biological wastes--the results of biological life--account for the remaining one-third of the pollution in this country. Also, it is more difficult and more expensive to treat industrial pollution than biological pollution.

Environmental control cannot be achieved by more specialized academic disciplines. This recognition is not easy to bring about. Many of you are in the academic world. You know how dynasties are built and how they are protected. Nevertheless, this group representing many disciplines is a good example of what can and must take place if the academic world is to make contributions commensurate with its capacity to solution of the problem. Further, the academic world cannot solve the problems itself. It must work with industry, business, labor, and government. It will require the best efforts of all segments of our society. Integration and coordination is most difficult. There are barriers between us, and communication is difficult. How many of you in the academic community here have had direct communication with the business or banking communities. Despite the difficulties, full and constant communication between the vital sectors of our society is essential to achieving environmental control.

We must also be involved as individuals. As individuals we must have perception and understanding of our environment in a broader sense than ever before. Perhaps this will make my point. When people were cave dwellers, they soon realized that it was not pleasant to live in a cave --primarily because they were not "house-broken". The environment was not suitable. Then they became "housebroken". Some people now are property-broken. They take care of their own property fairly well but are not concerned with their neighborhoods. We, as individuals, must become "neighborhood-broken", and then "community-broken", and then "city-broken". As industrial development increases we must encompass our country and finally the world in our thinking about environment. We should not only talk about this, but should become personally involved in doing something about it.

Control of our environment and the resulting rate of pollution can not be achieved without some control over population. Since the earth is finite, and its resources finite, there is a limit to the number of people and other living creatures it can support. What is that limit? The answer to this question depends on the kind of lives we want. If the life-style requires more material things, the production of which uses up the earth resources it follows the earth will be able to support fewer people--reach a saturation point sooner. If the life style requires fewer material things it follows that more people can be supported and the saturation point would be extended. These are fundamental decisions which we have to make.

What can be done about this? First, we've got to get more people to understand the interdependence of man and nature--that man is shaped by his environment and has the power to change it, for better or for worse. (I must say that during the last century we have certainly done a good job of changing it for the worse.) Second, we as a people should try to use only those materials that are essential to and facilitate our existence, and that are replaceable. Some of our natural resources are not replaceable. We ought to be conscious of the difference and act accordingly. Third, as consumers we ought to exercise judgment and buy durable goods that do not obsolesce quickly. Fourth, we should seek to recycle all those consumables that can be recycled. We should be aware of industries that consume materials needlessly and those that do not, and act accordingly.

It is difficult to teach others economically and ecologically sound concepts of living. People have to realize that one can lead a satisfying life without having three cars in every garage or 100 different toys for every child. Because ultimately the hard decisions that have to be made and are now being made to control the environment will be made by government at the local, state, and federal levels, we should support what I call economically and environmentallly sound politicians. Decisions bearing on environmental control are not easy to make. There is much pressure on elected and selected members of government to make decisions that do not promote the general welfare. We need people in office who will be able to withstand these pressures and vote for the self-interest of our society as a whole rather than the immediate benefits to groups or individuals.

The myth that progress depends on an ever increasing population should be debunked. This myth is close to the hearts of many leaders in our economy. More people assure more business and more prosperity. As I indicated earlier,ultimately this is a self-defeating process because many of the by-products (fall-out) of industrial development are detrimental.

It is true that our industrial development has produced the highest standards of living the world has ever known--a tremendous achievement. But it is also true that in doing so the fall-out and by products have seriously deteriorated our environment. We seem to have reached a point where the detrimental effects of the by-products of our industrialization threaten to surpass its benefits.

As you know the GNP isusedas a sort of yardstick of prosperity and the "good life". Our total gross national product is over one trillion dollars--an immense sum. To a very large extent this GNP is achieved by an accelerated processing and rapid consumption of the limited natural resources of our planet. This raises the question, is the GNP the best means to measure the good life in our society? Again, I think that increasing production is not enough. In conjunction with production we must give serious attention to the by-products of production which are detrimental to our environment and develop programs to eliminate or minimize them.

Another point I wish to make is that we cannot expect to save our environment at the expense of the poor. Most of us have experienced the benefits (material and comforts of material goods) that are encompassed in our country's affluence. Having experienced the relatively affluent life, it may or at least should be less difficult for us to cut down our demands for material things and to seek other values which may enrich our lives. The poor, not having had the material benefits of our society, have expectations to achieve them. It probably is too much to expect them to give up their expectations to acquire the material goods of our affluent society without first having had them.

The cost of restoring and maintaining our environment is high. The estimated cost is 185 billion dollars or 18 1/2 percent of our gross national product. Are we willing to pay that price? These are only the dollar or direct costs. There are indirect costs, such as changes in methods and materials of manufacture. The relocation of people and unemployment resulting from changes in patterns of consumption.

We hope such unemployment will not be extended, and we must be prepared to carry the cost of providing support for the workers and their families during the transition period. It has been estimated that as of 1970, there were 636,000 persons employed in occupations directly involved in environmental control. These people are engaged in the following activities: (1) straight ecology, (2) earth sciences, (3) resources and recreation, (4) environmental design and (5) environmental protection. It has been further estimated that by 1980 the number of jobs in this area will rise to 1,181,000, a 40 percent increase.

As indicated previously, our major problems related to controlling our environment include population, creation and control of recreation space and facilities, limitations on our economic freedoms. Who will control and how? Will it be government, and by what means? Literally, how do you control the size of a population? Will it be by law? Can this method be effective? Will it be by persuasion and education? We're really talking about limiting a precious, long-standing personal freedom. During the last two centuries the right of couples to control the size of their families has not been questioned. Nevertheless, society now is reaching a point where it must consider seriously whether individuals have the right to have as many children as they want to have.

We have conditions today which require the imposition of restrictions of personal freedom in the use of recreational facilities. There will come a time, and perhaps it's already here, when the use of some recreation areas exceeds their capacity. If a lake which can handle the pollution of a thousand people and renew itself, is used by ten thousand people that lake will be polluted beyond use in a very short time. Hence, some control over the number of people that will be permitted to use this facility will have to be imposed to maintain this recreational facility indefinitely. We hope restrictions of this nature on personal freedom can be achieved fairly and wisely.

I expect that painful limitations that will have to be imposed on the economic freedoms under which we have lived and prospered. Currently our patterns of consumption and production are in process of change, and I expect that there will be even greater change. The difficulties to be overcome in making such change are surfacing as conflict develops between economic expansion and environmental control. Frequently programs to preserve a wholesome environment are running against economic practices that have been in existence for centuries and under which we have prospered.

The following is an example of such conflicts. In the county in which I live a corporation applied for a permit to build a massive housing development. The sewer system serving this area does not have the capacity to handle the increase in waste products that would result from the resulting increase in population. The environmental control unit of the county prohibited the construction. However the construction corporation immediately brought great pressure on the elected representatives of the county. Within three weeks a building permit was issued and construction is now going forward--despite the fact that all the surveys indicate that facilities for handling increased human waste is not adequate. Undoubtedly many communities in our country are facing similar situations.

As I indicated earlier, industrial waste is even more difficult to handle than biological waste. Although some action is being taken to cope with such pollution, it is far from adequate. It is expected that a better informed and alarmed public will demand government action to reduce pollution. The confrontations will probably come in two or three years. Therefore it is important that the franchise be used to get people into office who will protect and promote the long-range interest of most of the people rather than the immediate gain of a few. This will not be easy.

Positions presented by both sides will be most compelling. Conflicts will be severe and abrasive. I suggest you watch these developments closely to determine the role you can play to further the development and/or preservation of a good environment. What should the role of education be in this all embracing problem of our society? First, I think that it is the responsibility of education to seek out and collate information on environment, its present state, its control and the biotic relationship between life and material on our planet. Second, the educational system should disseminate this knowledge. Third, it should, through such activities as research and development, break present knowledge barriers in this area. Fourth, it should take some responsiblity for changing peoples' attitudes, values, and behavior regarding control and maintenance of a wholesome environment. These are major tasks. However, we must recognize that our educational enterprise is the one social institution with the greatest access to our young people. The educational system can reach more people at one time than any other institution in our society. There are something like 50 million kids or a fourth of our population in classrooms. Keep in mind too that these youngsters will be able to vote by the time

they are out of high school. If their attitudes toward environmental control are constructive they can make an impressive contribution towards the shaping of our future society.

Education should have input in the environmental control programs being developed by other departments, such as HUD, Interior, Agriculture, etc. Education must continue to keep before the public, the departments and associations those programs that seek to preserve and/or protect the interest of the individual and society as a whole.

I want to take a moment to clarify my comments on one point. I don't think that industrial pollution, except for rare instances, is a result of evil intent. I don't believe in the "devil" theory of history. I think that business operated on the basis of accepted practice and paid little or no attention to its by-products. Currently, they are being called to account and have become aware, as we have become aware, that they cannot continue the same practices that were in operation for more than a hundred years. Industry is beginning to recognize that we are coming to the end of the line. Environmental control will not be achieved by accusing one or another segment of our society but rather by all segments of our society working together.

The Office of Education has taken the following action in the area of environmental control. The Office of Priority Management in the Office of Education is responsible for administration of the Environmental Education Act, passed last October with an appropriation of 2 million dollars. This money will be committed by June 30, 1971 to provide grants to institutions of higher education, state government agencies, local government agencies, as well as private and nonprofit organizations, and citizens' organizations.

The Office of Education Personnel Development (of which I am a part) had an environmental education program this year following which the Commissioner gave environmental education a top-priority rating in the list of objectives of the Office of Education. Since we had no appropriation to support such activities, funds were taken from other programs to support 12 institutes on environmental education of which this is one. For fiscal year 1972 we do expect the Office of Education to spend between 15 and 20 million dollars for this purpose. The Bureau of Educational Personnel Development will probably continue to administer the personnel development part of this program. The Bureau may have programs to train teachers, the trainers of teachers, and all other educational personnel who can play a role in environmental education.

States wishing to participate in programs mandated by the Environmental Education Act, will form a statewide council to plan and coordinate environmental control activities on a statewide basis. On these councils will be representatives of all the significant sectors in the state whose activities affect environmental control: i.e. education, industry, business, labor, health, clergy, and government. Among the major functions of the Councils will be to identify needs and problems, establish priorities, and promote legislation to enable the state to solve as well as prevent environmental problems.

One of the provisions of the Environmental Education Act prohibits the use of Federal funds by states to replace funds they previously used for that purpose. Federal funds are to supplement and not supplant funds now allocated for this purpose. Grants up to ten thousand dollars can be made to citizen groups--voluntary organizations of all kinds, to support courses, symposiums, etc., in their communities.

The Environmental Protection Agency, created last year is the Federal agency charged with major responsibility to control and protect our environment. It has a budget of 1.4 billion dollars, and six thousand employees. It is made up of units that were formerly parts of other Federal Departments, i.e. The Water Quality Administration and the Air Pollution Control, from the Department of Interior; the Environmental Control Administration, from the Department of HEW; Pesticide Regulation, from the Department of Agriculture. Several Senators are sponsoring bills dealing with pollution alleviation and resource protection.

Although many states have environmental control agencies, very few have been effective. As a whole they do not have enough power, authority, or funds to do the needed research, to disseminate their findings or enforce the laws and regulations. In general, states need tougher legislation and regulations, more effective enforcement, and higher penalties for violations. Currently, there are many environmental control bills before state legislatures. These bills attempt to control strip mining, limit use of dangerous pesticides, limit use of phosphates as detergents, limit oil discharges, other sources of water pollution, and auto air pollution. The Council of State Governments, a private national organization has a number of model bills on environmental control which are available to States.

Related Questions and Answers

Q. Why is the Office of Education Personnel Development providing funds for workshops?

A. The U.S. Office of Education is spending this money, painful as it was to obtain, by cutting other programs, because it wanted to initiate Office of Education activities in this area, and help develop a cadre of educators knowledgeable about environmental control in different parts of the country who could serve as leaders to catalyze activities in their education systems and communities. This program is expected to have multiplier effects. Participants in the institutes are expected to assume environmental leadership positions in their own communities or school systems. This may lead to the employment of environmental education specialists by school systems, who would develop curriculum materials that could be integrated into all subjects taught in all grades. I don't think environmental education should be taught as a separate subject in elementary or secondary schools but that substantive material on environment be made part of all subjects.

Q. What is being done by the Office of Education that will effect environmental education?

A. I have stated earlier that there is an administrative unit within the Office of Education responsible for the planning and the coordination of environmental education programs. Also that the Office of Education is expected to devote between 15 and 20 million dollars to support this activity next year.

Q. What impact does the proposal for revenue sharing have on plans for environmental education?

A. First of all, there is no legislation on the books at this time.* The administration has proposed such legislation. The Bill is both extensive and complex. I will just try to provide limited information on two parts of it. The first part involves a distribution of 5 billion dollars to states, without any strings attached. The state can use this money as it chooses. What are the pros and cons? Certainly, the communities and states need tax relief. Some people have called this part of the Bill not revenue sharing but tax relief. Some states have indicated that when this money becomes available they will use it to relieve the heavy burden of property taxes. Heavy reliance on property taxes to support public education is a major issue throughout the nation. Some educators have expressed the fear that this money may go to support that department in their state that has the greatest political "clout". This may be a Department of HighwaysorDepartment of Health. How does this affect environmental education? The amount of such money to be spent on Environmental Education will depend on the support of this program in the educational community, its representation on the councils of the state government, the attitude and priorities of the governortoward environmental control. If it has a high priority, is a major concern, more funds will be made available. If it is low man on the totem pole, it probably will not get much financial support.

The other major part of the Bill involves 11 billion dollars, which is the sum of all of the funds currently appropriated for some 33 categorical programs, plus 1 billion. The categorical programs range from manpower training to road construction. These categories will remain. However, the states will have greater flexibility in the use of some of these funds, because they will be able to shift as much as 30 percent of funds from one category to another. I may also add that this massive and most significant legislative proposal will not be acted upon during this session.

Q. What role does Educational Personnel Development play in teacher education, career opportunities, curriculum development, etc., in the area of environmental education?

A. The Office of Education will support the training of environmental specialists, will support the development of curriculum, and the methods of integrating such material into subject areas. For example, a small part of the Bureau of Educational Personnel Development

*Editors Note: A Revenue Sharing Law was subsequently enacted.

that is going on now, under its state grant program, supporting the training of teachers and teacher aides now operating in 50 states, may train environmental education specialists. Currently, two states are training environmental education teachers. I expect more states will support such training in the future.

Q. You mentioned the gross national product being our yardstick to measure a good life. What do you think of those people who advocate that our gross national product not increase?

A. I'll attempt to answer this one by asking a question. Are material things the primary ingredient of the full, satisfying life? Although a minimum amount of material goods are essential, the good life depends much more on the less tangibles, i.e. goals and their achievements, human relations, contact and enjoyment of nature. To a large extent it depends on our value system. The gross national product is based on production of goods and services. Can a good life be achieved without more goods and services? We can do this without sweat. Our gross national product would be increased, but who would benefit? More cars on the street would result in more traffic congestion and air pollution. I'm really not sure who this increase in GNP will benefit other than increase the profit of the car manufacturers. I would have no difficulty in favoring the increased production of goods and services if it were due to the construction of rapid transit system in our metropolitan areas, construction of health facilities and provisions of health services, more environmental control programs, etc. These facilities and services have not kept pace with the increase in our population, nor with our rising expectations for education and health services.

Q. Do you think that environmental education would be improved by reorganizing the Office of Education, perhaps making it a separate cabinet-level department?

A. When John Gardner was secretary of HEW, he was very much opposed to pulling the Office of Education out of the Department and making it a separate department. He thought the Department/HEW which he called the Department of Human Resources, encompassed programs that affected more people more often or more directly than any other Department in the Federal government. He thought that because Health, Education and Welfare are so closely interrelated that they should remain in one Department. Another point of view holds that as a separate department of education, the Department would have its Secretary representing education only on the President's Cabinet and is thereby in a better position to present and promote this interest. By contrast the Secretary of HEW may have greater interest in health than education, or welfare than health. Being human it is conceivable that he would tend to give those areas more attention and support.

Q. You mentioned the great potential of education in reaching a large segment of the population. What about the other 75 percent of our population? How can it be reached and involved?

A. In our society social action takes place through organizations. If communities do not have organizations concerned with environment, they should form them. If there are such organizations, they should be supported. Because of the great, and almost universal interest in ecology the time is opportune for action. Each community must play its part and develop its leaders to spearhead movement towards mutually determined goals.

A PLAN OF ACTION TO BE IMPLEMENTED IN NEW JERSEY

Edward J. Ambry, Director
New Jersey Council for Environmental Education

Edward Ambry deals with two aspects of planning for environmental education. One reflects philosophical considerations; some different and some similar to those of Dr. Fasteau. The second deals with operational aspects of initiating and sustaining environmental education programs oriented toward action and resulting in social change. He describes some of the organizational patterns that have been utilized advantageously in New Jersey. Ambrey's philosophical considerations include: Environmental education programs must concentrate on developing key concepts such as interdependence. Environmental education programs must emphasize changes in man's behavior, values, life styles, and attitudes, which will prevent environmental problems. Operational aspects include establishing coordinating councils to produce and support action and communication, and developing a State Master Plan for program development.

New Jersey has the rather dubious distinction of being the most populated state in the Union. Statisticians have calculated that 941.8 people inhabit every square mile (or would, if they were dispersed evenly throughout its area.) Actually, the population is concentrated in the Northeastern section, the center of an inter-state circle encompassing 15 million within a radius of 60 miles. The State of New Jersey is simultaneously the most urbanized and the most industrialized of all. Therefore, as night follows gloomy day, pollution is also in a superlative state in New Jersey. Some additional statistics to suggest the stygian situation: 750 sewage plants dump more than a billion gallons of inadequately treated wastes into major drainage basins every day; the highest concentrations of DDT were found in fish and ducks taken from these waters and tested by the United States Bureau of Sport Fisheries. (No one has yet tested us for a comparative DDT rating.)

Anyone who has ever had to travel through Northeastern New Jersey has always suspected this state of affairs--that the highway corridor between New York and points West is the one landscape in the world that could only be improved by billboards!

What is not as well known is that New Jersey has for more than thirty years assumed a leadership role in outdoor and environmental education. In 1949 it established the New Jersey State School of

Conservation, which the author directed for five years and which has since served as a teacher education and demonstration center for programs related to conservation and environmental education. All of the State Colleges have required their students to attend this school for one week during their undergraduate program of studies. Rutgers--The State University, through its recently reorganized College of Agriculture and Environmental Science has stressed research and specialized undergraduate and graduate study in addition to conducting in-service workshops for teachers. Three of the State Colleges (Glassboro, Trenton and Montclair) funded with over one-half million dollars from the United States Office of Education have developed Master's degree programs in environmental education.

New Jersey is also the only state with a Council for Environmental Education. Established four years ago as one of eight Title III projects devoted to this field, it operates under a grant to the Newark, New Jersey Board of Education. "The Council was formed to achieve the following six objectives: 1. Develop an evaluation instrument for environmental education programs. 2. Inventory all environmental and outdoor education programs and sites in New Jersey. 3. Assess existing Title III projects in environmental and outdoor education. 4. Determine whether inner city youth are being served. 5. Increase public awareness of the value of environmental education. 6. Develop a Master Plan for Environmental Education in New Jersey." The Council has discharged all of its duties; the Master Plan - the first to be developed in the Nation - was submitted to the New Jersey Commissioner of Education, Dr. Carl L. Marburger with recommendations for implementation. It was submitted to the United States Office of Education by Dr. Marburger.

Commissioner Marburger approved the Plan and the Council immediately undertook the task of planning and development for implementation. With a grant from the United States Office of Education, State Title III funds and additional financial resources to be made available through the enactment of a State Environmental Education Act (Assembly Bill A-1092), a five y[illegible] program of implementation will be launched on July 1, 1971. The program will be coordinated from a central office to be established on the campus of Montclair State College, Upper Montclair, New Jersey.

"The primary objective of the Plan is to create in the most rapid and efficient way possible, an environmentally literate citizenry--a citizenry who understands its interdependence with and responsibility for the total environment, and which possesses the knowledge and concern to solve existing problems and to prevent future ones. In the process, the Plan seeks to foster the greater use of the numerous learning environments which exist outside every textbook cover and schoolroom wall, and thereby to offer each citizen the deep satisfaction which comes from really sensing and understanding the daily flow of life around him."

To these ends, the Plan proposes: "1) establishment of a Technical Advisory Committee on Environmental Education whose primary mission is to advise the Commissioner of Education on a state-wide program of action; 2) encouragement of local school district Concerned Citizens Committees on Environmental Education; 3) strengthening the network of Environmental Education Centers; 4) support for the proposed legislation included in the Plan; 5) development of guidelines and multi-media curricula materials for environmental education in elementary and secondary schools, adult continuing education programs, business, industry and labor, government agencies, community action groups, community planners, public officials, and others; 6) establishing training programs for school administrative personnel, curriculum developers, teachers, teacher aides, student leaders, undergraduate and graduate education majors, college and university faculties, business, industry and labor management personnel, resource management and other public service personnel in government agencies, local, county and state planning, health and governing officials, and others."

The linchpin of the Plan is the Technical Advisory Committee. Twenty members are to be appointed by the Commissioner of Education for three year terms. Half the members will be selected from the worlds of government and education (six state governmental agencies), the colleges, principals and teachers from both private and parochial schools. The other half are to be recruited from everywhere else: parents, students, citizen service organizations, the worlds of business, news, labor, the churches, etc.

This Committee will review all the programs as they exist now and suggest ways to improve cooperation between groups and the flow of information into curricula. It will identify those people who are responsible for major curriculum changes on the state and local level and the capabilities of other environmental resources within the state and recommend means for their utilization. It will devise means to coordinate the capabilities of educational agencies with business, civic and federal agencies based in the state and develop a managerial plan for a comprehensive state-wide environmental program. The committee will consider additional regional centers and research and curriculum development centers. It will keep abreast of new sources of financial assistance and assess the new technologies for their potential use in environmental education programs.

To complement the work of the advisory committee, the Plan proposes Concerned Citizen Committees for each school district. Such Committees will serve as liasons between environmental organizations, local government agencies and the schools. The committees will assist the school districts in the development and selection of new curriculum materials. Changes in the curricula are at the very core of any systematic transformation. At this moment only one-third of the school districts in New Jersey have environmental programs of one kind or another. And among these, only some incorporate many grade levels for at least a term's duration. It is absolutely urgent that teachers and principals become aware of the seriousness of the environmental crisis and of their pivotal role in modifying attitudes and mobilizing energies.

The cutting edge of a new curriculum will be the application of environmental concepts to the solution of real environmental problems. "For example, a new type of homework could be assigned in which youth would involve parents and other adults in collecting data related to a local environmental problem leading to suggestions for its solution...Students could measure pollution of air and water, predict the life expectancy of existing solid waste disposal areas, conduct land-use surveys, study the history and design of zoning health and conservation ordinances, evaluate present and predict future water resource needs, and engage in real-life educational ventures."

The Plan provides for reaching the adult community through the already existing programs for adult continuing education. There is a need for "a course which begins with general principles and which progresses, through the use of local examples, to a consideration of the specific environmental issues of nation, state, and community." Such a course should be part of every adult education program throughout the state.

The public as a whole has to be reached as quickly and as continually as possible because it contributes mightily through its buying and disposal habits to the despoilation of our ecosphere. Forums, films, lectures, newspaper columns and series, educational displays, walking and driving tours can supplement television and radio coverage. After the massive public education campaign centered around the National Teach-In on April 22, 1970, those few industries who have sponsored modest recycling programs have been overwhelmed by the response. So far only a tiny minority of the public has been aroused; think of what will happen when many more actively concern themselves with recycling, with industrial indifference, with polical proposals and solutions!

The Plan concludes with such a proposal: an Environmental Education Act (Assembly Bill A-1092, introduced by Assemblywoman Josephine Margetts). In it, the New Jersey Commissioner of Education is authorized to promote the establishment and operation of local public and private elementary and secondary school environmental programs. Regional Environmental Education Centers will assist in each school district. "Instruction at these Centers shall include, but not be limited to the study of man and his environment, and problems of environmental pollution, erosion and survival as they relate to pollution, erosion, land use, ecology, survival and related natural, physical and social sciences." The Environmental Education Act is backed by a resolution passed by the New Jersey Education Association and is supported by the New Jersey School Boards Association, the New Jersey Society of Architects, and many other state-wide groups as well as interested individuals.

Contaminated waters--ravished landscapes--incredible waste--dying anachronistic cities that no longer serve man humanely--international conflict--are the unanticipated consequences flowing from a life style that has been praised as the "good life." Ironically, these consequences, in all their magnitude, fundamentally deny the value and dignity of man and life. Although the situation borders on the brink of disaster,

it also holds forth considerable hope, for many now perceive and understand the interdependence of human communities with the broader community of life and resources--the world environment. As a result of this new level of perception, there is a desire for significant change through the development of constructive alternatives. There is also a widening public awareness of the meaning of change itself--its rapidity, direction, purpose, and social and cultural consequences in a finite, interconnected world.

Purposeful, humane change has been the cornerstone of public and private efforts to improve life. Nevertheless, lacking in these efforts has been any overview--any attempt to integrate these individual, isolated efforts into a broader framework in order to make the overall direction of change meaningful and comprehensible. This is the real job of environmental education--to bring people to a level of awareness, perception and concern that will motivate and enable them to participate fully and critically in social change.

The New Jersey Master Plan for Environmental Education lays out a course of action which will result in a broad program of elementary-secondary-adult-general-public and higher-environmental education. It is designed to insure a unified and cooperative effort of the many isolated environmental education activities going on within the state.

New Jersey is frequently referred to as a "microcosm" of the nation's, indeed the world's predicament. When the Plan is transferred from blueprint into action, New Jersey may well become the model for the nations to turn to for inspiration and practical guidance.

CRITICAL FACTORS IN ENVIRONMENTAL ACTION

Clay Schoenfeld
Professor of Wildlife Ecology and Journalism
University of Wisconsin--Madison

Clay Schoenfeld indicates that successes in environmental education and its antecedents have come in piecemeal form. Rarely can one expect massive change overnight. Those who expect instantaneous change will find the business of environmental education extremely frustrating and disheartening. Overall planning must allow productive pieces to contribute to a cumulative array. The planning must be comprehensive and the projected time for change long-range. In addition, the planning activity must enlist support of personnel in key power positions by electing environmentally conscious officials. The most productive activity is apt to come from a small number of persons--a cadre of committed, action-oriented people who recognize both problem symptoms and causes.

I suspect that many of you are here under an illusion. Since we of Wisconsin are hosting this conference, with its primary focus on state and regional environmental education planning, you would rightly think that Wisconsin would have something dramatic and constructive to suggest along such lines. Yet frankly, our record to date is insignificant. This is a current fact about Wisconsin that is a little hard to explain in the light of our history. After all, the president of our university here wrote a book on conservation as early as 1912. This institution provided a novel academic home for Aldo Leopold in 1933. Our State Department of Public Instruction pioneered with a legislative mandate for the teaching of conservation education as early as 1935. In more recent years, the first federal Sea-Grant Program was established here, beside the "sea" of Mendota. And even more recently, the Green Bay campus of the University has become really the only university in the country whose curriculum is totally built around environmental concepts. In government, currently, we are blessed with an environmentally conscious governor, elected last fall. And yet we are having one heck of a time in our state in bona fide state planning for environmental education.

First, I'll tell you at what stage we are in Wisconsin, and then I'll try to be a little more constructive and report on some studies that we have been making in this broad general area. A year ago, knowing that our background and experience in coordination and

communication was faulty, and that to replicate the new carefully-paced New Jersey experience would require more time than we felt we would have under the proddings of the Environmental Education Act, we decided we go for the jugular, so to speak, and draft rather sweeping legislation. The Governor has chosen to implement part of our proposal by executive order. His executive order creates a state Environmental Education Council, composed of the heads of the institutions having environmental education responsibilities under existing statutes--these being The University of Wisconsin, the State University system, the Vocational-Technical system, the Department of Public Instruction, the Department of Natural Resources, and the state Electronic Communications Board. This Council is charged with three things: first, developing a state environmental education plan; second, appointing and listening to a broad-based environmental education secretary, that office also being set up by executive order. Approximately $90,000 is provided for this program in the states biennial budget.

The balance of our bill was, in effect, a mini-federal act, providing for a million dollars in state grant monies per biennium. That aspect of our draft bill will wend its way through the Legislature and, hopefully, will come out sometime in the next year or so.

In a sense, we have put the cart before the coordinating horse. We have the act in the form of an executive order and now it behooves us to get down to working together. Aldo Leopold once described the universe of conservation organizations as resembling a pack of dogs walking stiff-legged around a post. They really weren't quite ready to tie into each other, but they left their marks of conflict nonetheless. This has more or less characterized us in Wisconsin, and I suspect it has in many of your states, where environmental education is simply going to have to begin at home. Part of our problem is that, because of our long history and enterprise, we have a number of strong, going programs, each with a philosophy of its own and clientele of its own, and their primary interest is getting bigger and better on their own instead of cooperating. Hopefully, with the impetus that only a governor's executive order can provide and with a full-time coordinator of environmental education on the scene, we will begin to get off of dead center.

To be a little more constructive, I thought I might share with you the results of some studies that my seminar has been doing over the past three years in environmental information and education. We have been looking at the records of environmental action successes and environmental action failures. Beginning as far back as Hetch-Hetchy, continuing up through the Reclamation, Forest Service, and Park Service eras, on down to the Florida Barge Canal, the Alaska Pipeline, and the SST controversies, we have tried to isolate the common denominators that seem to come into play wherever success is present and that can be identified as being absent when failure is the result. These factors seem to me to be relevant for all of us as we grope toward effective planning and action for environmental education on a state and regional basis.

You've all heard it said that conservation is a crisis-oriented movement, and any case study that we look at documents this. There simply must be a perceived crisis for us to get off our tails in environmental action. There also must be present a small cadre of very committed people. It may well consist of only one person. Time and again, as you look at these success stories, you see the story, at least in its initial years, in terms of one guy, with a consuming passion, and also with a creed. He is deeply committed, not just to action--he isn't the Chamber of Commerce secretary type--he is deeply commited to a cause. He also has to be prepared to do his homework, and frequently to work in the vineyards for a long, long while before he gets any suggestion that anybody is listening. For example, the Wilderness Act of 1965, that we were all so proud of and that many of us rode home on, was drafted almost 20 years before by one guy, and was kicked around the halls of Congress for at least a decade. So environmentalism is not going to be an overnight success story. It will demand continuity. I think one of the things all of us have to disabuse ourselves of is the 30-second-commercial type of mentality that we get from TV, where everything is solved that swiftly. Sooner or later this cadre, or assortment of cadres, has to form some kind of consortium. There just has to be an agreement to "let's-get-together." For example, to use the most current example, those of you who read the case study in Saturday Review of the anti-SST campaign noticed the list of organizations that got together to form the SST consortium. A decade ago this was what was responsible for the birth of the Bureau of Outdoor Recreation--a consortium. Forming some kind of a critical mass--this is the difference, in our business, between success and failure. Then, very quickly, this consortium has to develop a concept of operation. In other words, you do have to have a plan, and particularly a systematic plan of communication. One of the best stories on this aspect of key factors has been told by the Clean Up the Hudson Committee that a couple of years ago sold that huge bond issue to the state of New York. Their communications plan is nicely outlined in an after-action report.

Then you'll begin to pick up cohorts, frequently in unexpected nooks and crannies of the public. This is what is called citizen involvement. Frequently odd bedfellows join you; I guess you just have to be prepared to let even the infidels join the club when that's to your advantage. For example, in the case of the saving of the great New Jersey swamp, the primary source of funds for that campaign came from Schenley Distilleries, which you wouldn't ordinarily think of as an environmentally conscious industry, but it just so happened that they owned significant acres on the periphery of the swamp and they were much more interested in looking at a conservancy than at a jetport.

Then there has to be a crystallization, and I guess this is the point where PR tactics come in most directly. You have to reduce the whole issue to something that the average person can grasp, and frequently you must get it down to the level where you can just

vote "Yes" or "No" on a ballot. A lot of us, who of course know the indescribable complexities of ecological problems, resist this kind of crystallization. Yet, in terms of eco-action, it is absolutely essential. One of the prime examples of this phenomenon is the event we witnessed a couple of months ago when all of the economic and esthetic and ecological issues of the country found their focus on one airplane. The SST came to epitomize this complex clash. If the issue had been drawn in terms of a law dealing with esoteric interpretations of the Gross National Product, that would have been much too fuzzy. But you can vote against an SST.

We also have to hope, pray, and try to create a favorable climate. We have all seen in our own communities in the last couple of months, or last year, environmental successes that would have been unattainable before E-Day. Ecology is simply one of those ideas whose time has arrived. Going back to the idea of cadres and the cohorts they pick up, these latter are motivated by confidence and they are motivated by love. They may have gotten into the game because of fear, but fear is a very short-run motivator, and when it isn't replaced by hope it produces more frustration than it does action.

You certainly have to be prepared for conflict, and we are only at the beginning of sensing how deep these conflicts are going to run. Next, we also have to be prepared to compromise. This is one of the toughest things for the younger members of the movement to accept. They are not yet used to making those adjustments that are the glue of our kind of society; they are an all-or-nothing type of fighter. Yet time and again, at least up until now, the successes that we have had have been due to the acceptance of limited objectives, which may have meant giving away certain trading stock that at the moment it seemed worthwhile to lose. We may increasingly be less willing to compromise, but at least up until now this has been part of the success story.

The great turning point in environmentalism in this country, I think, was the 1954 Echo Park fight to save Dinosaur National Monument from a Colorado River dam. Up until that time organizations like the Sierra Club had not really had a national environmental posture. But Dave Brower and a couple of other people put together a highly effective consortium to block Echo Park Dam. They blocked the dam. They had to make a compromise, they had to allow some smaller reservoirs, but they did save Dinosaur. They also had to make a deal with Congressman Aspinall. We've come to regret that since the deal was that Congressman Aspinall was to become head of the Public-Land Review Commission. And we are now refighting the battle of Echo Law Park, in a sense, as a result of that decision. Compromise has its limits.

Finally, you've got to have cash. It's been interesting that over the years in successful eco-action the cash has come from two principal sources. First, from wealthy individuals. You can go right down the roster of the saints in conservation and they were all, with few exceptions, indpendently wealthy men: Pinchot of the Forest Service, Mather of the Parks, FDR--all putting in their own money. In more

recent years, of course, the Rockefeller brothers almost single-handedly funded the OORC Report and the Bureau that grew out of it. We're running out of that gross kind of source, due to income taxes, so we're turning more and more to small private donations and to tax dollars. The second primary source of funding over the years has been the hunters and fishermen of the country. They continue to be the only real consumers of outdoor resources that have voluntarily taxed themselves and continue voluntarily to fund much of the environmental protection programs that the rest of us are enjoying. When we start taxing the bird-watcher's field glasses and the camper's tent and the polluter's effluent, we will begin to develop the resources we need for the environmental fight.

These, then are the factors that must be present in order to have success in environmental action. I have to confess that not enough of them are present in Wisconsin at this time to give us a viable environmental education planning and action program. Hopefully they will emerge, and our primary purpose in inviting you here to Madison this week was so that you could tell us how to do it.

DIMENSIONS OF

ENVIRONMENTAL EDUCATION

PROGRAMS

CURRICULUM ORGANIZATION: AN OVERVIEW

Effective curriculum organization and planning of related instructional design must be based on consideration of environmental education as a philosophy of education as well as a substantive area. Therefore, developing an environmental education program requires a new approach to curriculum and instruction. Curriculum becomes a way of thinking, while instruction involves designing ways to facilitate interactions within the "domain of environmental education" (see "Planning Guidelines: An Overview," page). This approach seeks to better utilize existing resources as much as develop new products.

Basic individual needs must also be met in an effective environmental education curriculum. Activity must be directed toward helping persons become what they want to be (within boundary conditions mediated by ecological "law"). Only after a person has faith in himself and existing man-made institutions, can he proceed to considering broader environmental needs. Activities must concentrate on implementing this process.

Thus, both the school's role as an agency for carrying on environmental educational activities and educational programs in general must be reexamined. Educational programs must help people understand why we gather knowledge. Knowledge helps solve personal problems as well as societal problems. The learner must see schooling as one important part of learning for life rather than a "fact-and-figure jungle" to be escaped from at the earliest opportunity. Environmental education must help develop environmentally responsible values and, particularly, help clarify personal values and attitudes. Environmental education accepts values clarification as a necessary and meaningful activity.

Curriculum planning for environmental education must be long range. The usual development of courses and other short-term inputs have a low probability of success unless they are a part of larger plans. If we do not plan long range and comprehensively, we are guaranteeing our failure in environmental education.

Planners must be cautious about depending too heavily on technocatic thinking in environmental education activity. Even as solving environmental problems via technology has down-graded a consideration of problem causes, this same technological ethic in environmental education could divert us from a critical activity: Challenging existing value structures and fostering changes in others. The learner should have the opportunity to view change as a natural process and be given opportunities to study and challenge the change process. There must be concern for the physical environment's effect on man and his behavior. The curriculum must provide opportunities to study the effect of buildings and other structures on man's behavior, rather than only being concerned with "more and better" new buildings. In fact, this type of study is more suited to a long-term activity, rather

than the usual concern for accomplishment of short-term behavioral goals.

Instructional planning must include a careful analysis of negative messages learners continually receive in their educational environment. For example, one message says that school and other educational programs are separate from the environment--so just turn off whatever is happening beyond the school walls. To eliminate these kind of messages and concentrate more on positive messages, instructional activity must involve studying the interrelationships between all the environments of man. These interactions necessitate recognizing that the school is only one part of the total educational community. Students and other learners must have constant opportunity to interact outside the school in the larger community. Instructional planning can foster this type of student involvement by providing analyses of community environmental patterns and giving students choices of interaction with the community environment.

Students need to develop their own data collection techniques, to analyze costs in terms of choices and determine how choices are affected by values. They need to define for themselves what desirable behavior might be for obtaining a quality environment. They must recognize that personal or cultural conflict often arises in alleviating environmental problems. These conflicts must be resolved if a quality environment receives first priority. Finally, instructional activity should help students see the impact of personal and collective actions both for and against environmental quality.

Unfortunately, present research efforts on developing curriculum and planning instruction for environmental education are minimal. Thus, planning efforts must include interrelated research and development activities. We must assess consumer concerns and develop curriculum to help deal with these concerns. We need research on the nature of local problems and their relationship to problems of broader scope. We need information on data transmission techniques and the role of health in environmental education. We also need sociological studies to probe attitude and value changes of people toward their environment.

ENVIRONMENTAL INFLUENCES ON HUMAN BEHAVIORS

W. M. Smith
Lecturer in Resource Planning and Conservation
University of Wisconsin -- Green Bay

W. M. Smith reviews research on how the man-made environment affects man's behaviors and actions and the implications of these studies for environmental education curriculum development.

One area of research involves the design of physical facilities and the space allocations within them. Physical facilities can create withdrawal behavior and negate establishment of social interaction patterns. They can create a lack of personal well-being and give rise to many symptoms of mental illness. Research results indicate that existing school facilities may be major inhibitors to effective environmental education.

Smith states that environmental education must incorporate awareness, and study of those factors which affect the man-environment interaction. These include the effects of natural and man-made environments.

The emphasis of this workshop is on the natural environment: water, air, land, animals, forests. I'd like to talk instead about the built environment--that is, the environment in which we all live: buildings, the layouts of communities--and what these kinds of constructions do to human behavior. I would like to aim my talk at three aspects. First, a quick overview of what we know so far about the effect of environment on behavior, particularly with respect to the built environment. Second, I would like to talk about research now in progress on this question. And third, I would like to talk about some new directions for environmental education--for environmental curricula--which I'm sure would fit most satisfactorily with the considerations that you have under way here.

By way of an overview we can talk about some of the people involved with the question of how the built environment influences our behavior. This is a relatively new area of study and we certainly know far less than we will ten years from now. To draw an analogy, we didn't know much a few years ago about the effects of mercury pollution in fish; now we're beginning to find that it afflicts almost all marine creatures. I think the same situation exists as to the effect on behavior of how we construct our dwellings.

Robert Sommers, who is presently at the University of California at Davis, was one of the first individuals to seriously consider what man does with the space about him. He has said that each year we build tens of millions of dollars worth of buildings--housing, office buildings, institutional buildings, schools, all kinds of structures--but we have no knowledge at all about how these structures affect the users and almost never do we go back and ask the users how they like what has been built. The result of this can be seen in a few instances to have had high tragedy. The best example of this is the Pruit-Igo apartment complex in St. Louis, Missouri. Here they built several high-rise buildings--what we call Post-Toastie boxes set up on end--some fifteen or more stories high, and found that over a relatively short period of time, after an expenditure on the order of 23 to 25 million dollars, they are now having to tear the whole complex down simply because it was not designed for human habitation. The way it had been designed predetermined that it would be unsuitable for the people who were going to live there. I'll go into some of the reasons for this later. But just from this one experience and with the funds that were used to construct it we could have made some very substantial advances in our knowledge about built-environment effects on behavior. However, no one ever thought about going in and looking at the first building once it had been put up and asking the people living there, How do you like it? What do you find that you need changed? Would you suggest that another building of this sort be constructed? Instead, many buildings were put up, and then it was too late. The only alternative left was to tear them down when they proved that they wouldn't work. This process of building without knowledge is wasteful--it's wasteful in terms of funds and it's wasteful in terms of health and well-being of the people who live in these habitats.

The only architectural firm I know of today that regularly uses the kind of service I am suggesting here--which is, going and asking users how they find the building that has been built--is the Ewing-Miller Associates, in Terre Haute, Indiana. They are a very large and prestigious architecture firm, with offices across the country, and they have as part of their commission the construction of a large number of dormitories for the various University of Indiana campuses. They found they could save the state a great deal of money if they simply asked the people living in these dormitories whether they liked them and what they would like to see changed, if anything. One of the problems the state had begun to run into--and this is the case on many university campuses--is that students are moving out of the dormitories in large numbers. One reason for this was found to be that students did not like the way the rooms had been laid out with respect to furnishing. So as a result of a survey they made, they found they could save a great deal of money by not furnishing rooms--simply let the students choose their own furniture and bring it in, or at best provide a warehouse with one or two or perhaps three different selections and let them bring their own choices in and put them in the rooms. This saved time, it saved money, and it increased user satisfaction.

As a second example there are the five windowless elementary schools that were built in California, the design being based solely on engineering considerations. It was felt that with a windowless school the normal transmission of heat through windows would be reduced, costs could be cut and somehow this would be good. Well, after they built the first one it was found that they were indeed able to do this, they could cut their heating and their air-conditioning costs considerably. So in their enthusiasm five more schools were built. The result was a total of five schools where recent surveys have shown the parents are dissatisfied, the students are dissatisfied, everyone is dissatisfied--including the teachers. And yet they have a very large investment in a physical plant that they can't get rid of very easily. Again, instead of taking a look at what they were doing before they committed more funds, they simply went ahead and put up more structures. This kind of example of error is repeated again and again elsewhere.

Now with respect to the kinds of studies that have been done so far, there are a few that suggest the kinds of things that happen in the habitats we are building. Boyd, who is with the Environmental Research Foundation in Kansas City, has done a study recently of high-rise apartments. What he finds is very revealing, because it relates to environmental effects occurring in some of the more isolated regions of the world--in the Alaskan and Canadian arctic. We find that in high-rise buildings people tend to withdraw from one another. Characteristically they don't know their neighbors, they don't establish social interaction patterns with their neighbors. Indeed, social interaction patterns that are established are almost exclusively with people that live outside the building complex. Claire Cooper, who is with the department of geography at the University of California at Berkeley, has found essentially the same pattern in some of her studies of housing and high-rise developments in the San Francisco area. What this says, in essence, is that if you construct a building in a particular way and ask families to live in it, you can virtually assure the kinds of alienation we are all talking about and that we would all like to avoid.

In France, single- and multiple-family housing has been studied and it has been found that the size of space needed per person is approximately 75 square feet. Now, these figures are based upon a sample of individuals whose economic class is lower middle and it's questionable whether we can translate these results to our own country. But he finds that once you go below this amount of square feet per person there is a marked increase in feelings of lack of well-being and also in various symptoms of mental illness.

Mitchell, who is at the University of North Carolina, recently completed a study in Hong Kong, which has one of the highest densities of any city in the world. His question was what do we find in a city where space per person is generally at about 25 to 30 square feet per individual--at least for those fortunate enough to live in some kind of a habitat rather than on the street or in the gutter or on the sidewalk. What he found is quite characteristic of

findings in high-rise and high-density living areas in the United States. He found that the higher you go in the building the less satisfied the people are. Also, the higher you go the fewer social interactions individuals have--that is, people do not invite others over for social gatherings. This seems quite reasonable. If you have a small space and if you live on a high floor it's very difficult to have people in, particularly if there's more than one family living in an apartment. He found that one of the large dissatisfactions was with women who had small children--that from these high stories they could not keep control, at least by visual observation, over their children. The same has been found by Boyd and others in this country in high-rise apartment buildings.

Now turning slightly from this line of work, Paul Gump and Roger Barker, at the University of Kansas, for a number of years have been doing work on how people perceive the environment in which they live and the cognitive maps that people draw of the areas in which they reside. They find something that seems to support the cherished belief we have in this country that somehow smallness is equated with goodness. Now, this is not necessarily the case, because there are other factors, but what they find is that children who live in small towns (30,000 and below) have a much larger psychological world to live in than children from larger cities (150,000 population and above). In short, the child who lives in a small town lives in a much larger world than the child who lives in a large city. He knows the neighbors, he knows who the mailman is, he sees a great deal more of the world everyday, his experiences are much richer, he has far wider ranging contacts than is generally the case to be found with children living in larger urban areas. This suggests some ways we might replan the size of living areas, if in fact we ever get the opportunity.

In community planning we can turn from the larger structure of the living space to the smaller and more intimate aspects and we can talk about one room in the house which is dear to most--the bathroom. Now, the bathroom in our housing in the United States is a very unique room and it's becoming more unique as time goes on, particularly with the way our habitats are being designed. Note that virtually none of the housing going up around our urban areas is designed by architects; it's taken from various manuals of floor plans and is then put up by contractors. Architects rarely have any input for the simple reason that individual housing, unless it's very expensive housing of a showplace variety, doesn't pay the architect for his time. It's the commercial establishments that take most of his effort.

The bathroom, we find, is used for a variety of purposes other than its hygienic purpose. In most houses it is one of the few areas--if not the only area--where individuals can get away from the rest of the family. We can lock the door and because of the nature of the things we do in there, our presence is not going to be questioned. In elementary schools the use of the bathroom is something that goes beyond general hygiene. If, for example, a child is called upon to answer some questions on a test that he doesn't know, one way out is to raise his hand to go to the bathroom. It's a good

escape mechanism and he's usually not questioned on this. The bathroom is also a sanctuary for people in boring routine office jobs; they can take the newspaper and have a sanctuary to go into where their privacy will not be interrupted and where they can spend a few quiet minutes catching up with the world's news.

If we did not have bathrooms such as are in our houses now, then certainly we would have to design some other area. It's the only place where a person can go and have a good cry--you can turn on the water and no one can hear you. You can read, you can examine your body, you can look at yourself in the mirror, you can think thoughts and you can do a variety of things that you cannot do in the other parts of the house, which now has more of an open plan. The interior doors of our houses usually do not have locks on them and if they do, sound transmission properties are such that you can hear even the faintest breath. So the bathroom has assumed a role and a position in our housing out of all proportion to its intended purpose.

Now we can ask the general question: How and in what way does housing and community layout and design influence health and well-being? We know from public health studies over the years that the transmission of disease is intimately linked with the way we design and lay out housing. But what is not so clear, and what most people don't realize, is that how we design and even how we decorate the interior will have an effect upon our health. In hospitals, for example, Sivadon, who is a French psychiatrist, studied the shape and the design of interior spaces in mental institutions. He found that it makes a great deal of difference how you design the inside of a mental hospital and if we wanted to make people sicker we couldn't be doing a better job. Many people who are mentally ill, certainly those who are put in the category of schizophrenic, want to withdraw, they don't want to be with others, they want to find a cubbyhole to creep into. Yet, we are designing our mental institutions so that patients are continually on display; there is no sanctuary they can withdraw to. Sivadon found that at one Swiss hospital the architect had decided to make a round structure. Now, a round structure is very nice; the only problem is that schizophrenics seem to need some perceptually vertical axis in a building. If they don't have this, then the long corridors tend to narrow down and it becomes extremely upsetting for them. In a round building, where you have no beginning or end, the corridors simply go around and around. This proved very distressing for the patients. What the architect did to correct this was to make small, intimate spaces at various spots along the corridors. Here the patients could find places suitable to their general inclination to find small, secluded nooks, places they could go into and keep out of the way. As they progressed and become better, they would then go into more public spaces. You could predict quite accurately who was getting better and who was not getting better simply by the spaces in the building that they were occupying.

Similarly, a number of studies show that wall paint in hospitals has a great deal to do with how people recuperate. If we paint with institutional colors of white or green--generally glossy finishes

chosen for ease in maintenance rather than for their contribution to feelings of well-being on the part of patients--we get a very peculiar effect. There is a perceptual phenomenon called a homogeneous visual field. This occurs when a surface reflects equally the incident light that hits it. This characteristic inhibits one's ability to see anything. Remember that our ability to perceive the world around us is due in great part to inhomogeneities in the texture of surfaces and that ordinarily the surfaces of walls, ceilings and floors reflect incident light in differing amounts. But if approximately the same amount of incident light is being reflected back to us from all surfaces, then what we see is a featureless visual world. We can see this in the country on snowy days when there's a cloud cover, the cloud cover and the field of snow tend to merge into one. What we have, in German terminology, is a Ganzfeldt--a homogeneous visual field. Well, imagine a patient lying in a hospital, in a room painted a uniform color and imagine that he has only a small area of the ceiling and the wall to look at. It can be of some concern if he can't tell where the ceiling leaves off and the wall begins. Indeed, many hospitals are painted just this way and it gives the person a sense of being closed in, of being in an unreal world and this certainly does nothing for his improvement. Ewing Miller and associates have found that the hospital entryway has often been designed totally wrong. Designed for ease of maintenance alone, these entryways give the prospective patient, the one who goes in quite ill, the sense of a slick chute going directly into the grave. You walk into the hospital, you see the terrazzo floor, you see slick-painted walls, you see corridors that gleam. This is all very fine and hygienic and no bugs are going to hide in cracks, but for the person walking in the door who's going in for a serious operation, it can be extremely upsetting.

Finally, we can talk about the patterns of community design. Most of our communities are laid out in a grid pattern, little rectangles and little squares. A real question can be raised whether this is the most desirable community layout. We don't know for sure, because we haven't done it otherwise, but certainly we can and we will in the future think about this. And perhaps in the not too distant future we'll be able to experiment and see whether there aren't different ways that will give us something more satisfactory than what we now have.

I'd like to talk now about some research projects that are currently underway and some of the results that we obtained so far from working in various locations. Then I will talk about some of the curricula projections that I have. First, we'll look at some slides taken in the arctic in northern Alaska and in the arctic area of the Northwest Territories of Canada.

(Following is commentary on the slides that were projected.)

1. This is the Arctic Ocean and the Arctic coast--the most northerly point on the American continent. This is the village we are concerned with; over here's the DEW-line station, manned by

civilian personnel.

2. This is the main street through this village. You can see that, with respect to the kind of housing we have here, there's one predominant theme: this is World War II vintage design, dormitory housing and what we refer to as Bold New Experiments, which really aren't bold new experiments at all.

3. You can see that this is simply Quonset hut housing, with a few concessions to the cold in terms of insulation.

4. This is family housing. This, by the way, is not a military installation, it's civilian. The entryway is on the other side of the building--central entryway. There are two apartments, one on each end, and each with one bedroom. You have approximately 800 square feet, or less and when you pack people in here, a family of two or three or even four, then you have virtually no room at all to move.

5. This is the kind of weather we have in November. You can see that the sun at its high point gives about this much illumination.

6. Towards the latter part of November the sun is skimming the horizon.

7. The first part of December, this is the picture.

8. And finally, at one o'clock in the afternoon, a couple of weeks before Christmas, this is the kind of light you have.

9. Now we will move to the shanty type of housing. This is characteristic of the native villages in the North.

10. The housing, as you can see, is shanty; it has no interior conveniences such as running water or sewage. Sewage disposal is performed by the individual person, and it's emptied into these fifty-gallon drums.

11. Part of the week's water supply sits on the porch.

12. Even the new housing, which is federally funded in the form of long-term, low-cost loans, ends up in a few years being housing no better than this. The way the house is designed--although it looks good at first--is not suitable for this kind of climate.

13. During summertime, disease increases. Sewage falls out of these fifty-gallon drums, which are trucked out to the dump on a piece of sheet metal. Sometimes the sewage is covered over with dirt, sometimes simply put on the pile and left for all to see.

14. Now we can move to what I call the dormitory type of housing; this is characteristic of DEW-line stations and other government stations in the North. DEW-line stations are located right on the edge of the Arctic Ocean; the closest large city would be about 500 miles to the south. Usually there are ten to twelve people living in these places.

15. You can see that the style of construction is a long module train, a bunch of building blocks put together.

16. Now, the reason for building it in this fashion is that, first, you have to put your buildings on piles--otherwise they sink into the permafrost--and second, in case of fire you can bring a tractor up and knock one of these modules out of the train. The visual effect you get by standing at one end, if all the interior doorways are open, is like looking down a long gray corridor. It's much like being on a ship; in fact, if there were any motion I'm sure you'd get seasick.

17. Now we move to what we call the Bold New Experiments. Canada is the only country on our side of the Aleutians to attempt this. Here we're looking at the village of Inuvik . Now, Inuvik is laid out in a typical suburban fashion, in a grid pattern. We see school buildings where they bring children in from the outlying camps as far as 800 miles away. Children from six years of age up through high school come and board here for the winter.

18. The housing is served, as you can see, by a long pipeline, which is called a utilidor system. This is a sheet metal covered tube in which run sewer lines, fresh water lines (hot and cold), heat--all running from a central point, and each house has a branch takeoff.

19. The housing varies in quality from one end of the town to another, the natives, as one might expect, taking the greatest beating. There are no utilidor systems on their end of town. Where the government-owned housing is located are the habitats with utilidors.

20. You can see that, much like in Scandinavia, they paint their housing different colors. Over here we have four-plexes.

21. The apartments of a four-plex consist of, downstairs: a living room, dining area, kitchen, storage area; upstairs: two or three bedrooms and a bath.

22. They also have for unmarried people, a single quarters consisting of small cubicle rooms.

23. Here you see the utilidor systems taking off from the main-branch building.

24. This is the school.

25. And a church. Now, the church is very interesting and I should relate one story about it. As you can see, all the buildings in the area are rectangular or square in shape, and this is by government decree. They decided that this was the only type of architecture that would be tolerated. The priest decided that this wouldn't do for his congregation at all. So, unbeknowns to the government, he and some of his people constructed what is called The Igloo Church and it's certainly the nicest building in the whole town. Of course, when the Canadian government found this had happened, they were going to tear it down. But they didn't tear it down and now it has become quite an attraction and a bright spot simply because it's a bit different.

26. Again, the most popular building in the village.

27. The village has a small library.

28. We've found that people almost never have enduring social interaction patterns within these housing units, they almost always will go outside or to another building but not with people who live in the same block.

29. This is the Hudson Bay Company, and inside is a department store that has just about everything you can imagine. I'll talk about the importance of this in a little bit.

What you've seen, very quickly, is one area of the world and the kinds of habitats that exist there. Now, it doesn't take much imagination, after looking at these kinds of buildings, to imagine what they must be like inside. They are as dreary inside as they are outside. They are not designed for this area of the world, they were designed for elsewhere and transplanted. In short, what we have done in many instances is to transplant suburbia to very rough environmental areas. Then when we find people becoming sick, when we find high rates of turnover and other problems, then we begin to wonder why. We find several problems in these towns and we're beginning to see correlations with what is going on in cities and small towns down here in the more temperate areas.

The first thing we find, all across the North, is a high rate of dissatisfaction among women. Now, this is quite understandable when you realize that the reason families go north is not the wife saying let's go, they go north because father says I'm going up there and work, or perhaps he's propelled to fulfill some fantasy he has. When they get there, typically, they find there is none of the behavioral support mechanisms that women are used to. In few instances are there shops, there are no beauty parlors, there is nowhere to go outside of the home usually. And for children, there are few of the facilities children are used to, there are none of the play areas, or very few of them. In essence you become house-bound. The husband goes away each morning to work, the wife stays home, and the children, if they are fortunate enough to be living near a school, go to school. Over a period of time this causes great problems. Two-thirds of all the women we looked at across the North were taking psychotropic medication of one type or another, their predominate symptom being depression. Now, this is a very high proportion; the rates here in the lower forty-eight are certainly not that high. And from everything we can tell, the taking of this type medication started after they arrived, not before. We feel that, among other things, the way these places are designed and the kind of habitats that people are living in are generating mental problems.

Second, with respect to the children, we find motor retardation in children under the ages of four. Here I'm talking not about native children--because they go out and play--but about non-native white children, whose families bring their own culture with them. We find that the housing is not large enough to allow children to run and play.

And as you know, children of one and one-half, two, three, four, five years and up are very active; they are engaged in some type of motor activity almost all the time. This is the sign of a healthy child. But when you go into these villages and walk into a house, you find children--who normally should be running and jumping and yelling--sitting very silently against the wall, playing quiet games. There's a very good reason for this, there is not room within the housing to tolerate the kind of motor activity that generally is associated with small children, and the parents can't stand the continual activity--quarters are too close. So the children are constrained to quiet games. For the child, this retards the development of motor skills. The question arises: If you do find indication of developmental retardation in motor areas, might you not also find this in cognitive areas? We don't know for sure that this is happening, but we're planning to take a look at it.

The third thing we find is a high rate of alcohol consumption in these areas; the alcohol consumption in the North is nine and a half times the per capita consumption in the United States as a whole. We find there is an annual summertime migration on the part of women and children down to the more temperate areas to live with in-laws. As soon as the local schools are over, families leave, the husbands stay, oftentimes the wife and children never come back. So we have a continual churning of population. Associated with all this, of course, are high rates of divorce and as I indicated earlier there is a mental-health problem the extent of which we're not sure of, but we think it is rather severe.

I suggest that many of the same things we see up North we're facing right here, because of the way we're designing and the way we're building the suburban areas. This fall we're starting a study of the suburban housing area in and around Green Bay, Wisconsin. Green Bay, although it has a reputation for cold, really doesn't have such a bad winter; it's a little cool but certainly it's nothing compared to Arctic areas. In northern Wisconsin you do not usually find people out of doors, this is especially true for the women and the smaller children. A question immediately comes to mind, based upon our experiences in northern regions: What do we find among families living in the suburbs, in housing that does not allow enough activity areas so that children can have their own area without overlapping with parents? We think we are going to find the same kind of symptomatology that we're finding in the North; that we have designed housing that is fine if you live in year around warm areas, where you can get out of doors, but is not fine if you have to spend long periods of time indoors. In short, if the house doesn't fit, if you don't have the areas of space and proper design so that members of the family can get away from one another and carry out their own activities, problems probably do exist. In warm areas you can go outside but you can't do this when the weather outside is cold. So what we find is housing being put in northeastern Wisconsin that is designed perhaps for Florida and I think we will indeed show that it doesn't work too well. I think that again we will find high rates

of alcohol consumption, heavy dependence upon psychotropic medication and certainly all the symptomatology that goes with lack of mental well-being. Again I stress that the big effect is on women and children, because they're the ones that stay home. However, as yet we don't have data to document this. I think in another year we will be able to say something more.

Now, what can we do in terms of curricula that will alert students--elementary students, high school students and university students to these problems? The problems of environmental effect on behavior are perhaps not of as great magnitude as mercury poisoning or air pollution, because these latter things can kill you off very quickly and are often irreversible processes. But certainly the kinds of things we're looking at may be almost as irreversible. If you've ever tried to get a county or a city planner or the board of supervisors to agree on a plan of action you find that it's just about impossible to get them to act in concert. So we may have a situation that will require even more effort than cleaning up the air and the land and the water. I would suggest that there are a number of ways that we begin to attack this environmental problem.

At the University of Wisconsin, Green Bay, we started a two-semester course this January that we entitled "Human Living Space." What we are doing essentially is assessing the present state of knowledge of how these environmental problems affect human behavior. This is presented during the first semester. The second semester, will be the lab course, where we will have students go out into the community and look at the ways in which people use the space around them. We will look, for example, at recreation areas and parks, to see how people use these areas. We will be looking at downtown spatial areas, we will be looking at the suburbs, we will be talking to some of the people who live in these housing blocks. Much of this information we will channel back to the Department of Planning, for Brown County. They are concerned now with building new parks but they don't even know how the parks they have are being used, they don't know who uses them, nor during which hours of the day, nor even what kinds of equipment are used. So they are doing what we've always done with our built environment: they're putting up new things on the basis of intuition, not upon the basis of any kind of knowledge. This is the way we've stumbled along ever since we first began to build this country and I submit we can no longer do this, we can't afford to. So we have this one course at the university level which will train students to become quite aware of these factors.

I think the same thing can be done, perhaps on a lesser level but maybe not so much less, at the elementary and at the high school level. Anybody can get out and take a look at people, how people use a park, who uses the swings and slides, how frequently. You can take a look at how many people in your block go outside during the winter-time and play and how many people tend to stay indoors most of the time. These are things that even an elementary school child could get information on, so I think that here is an area that we can work in.

There are a few references I would recommend to you if you are interested in following up on the subject of this talk. The first of these is a journal called Environment and Behavior; it's put out by Sage Publications, in Beverly Hills. This journal, as its name implies, carries much of the current research on how our environment influences human behavior, particularly the built environment. The second reference I would recommend is a relatively new textbook which is a compilation of older but nonetheless very relevant articles. It's entitled Environmental Psychology, and is published by Holt, Rinehart & Winston, in 1970; its authors are Ittelson, Proshansky, Rivlin. The third reference is Edward Hall's work--his principle work--titled The Hidden Dimension, Doubleday and Company, 1966. Most libraries carry this, it's a very popular book. Finally, there's Bob Sommers' book entitled Personal Space, published by Prentice Hall, 1969. These would give you an insight into some of the things that have been done. Although, in terms of text materials, they are a little bit out of date, still they would bring you up to current knowledge in a very short period of time and you could see for yourself whether this would be an area to consider for your courses.

Related Questions and Answers

A. You stated that in France there's 75 square feet per person, that this was a moderate or acceptable amount of space, that problems of mental health and transmission of other types of illness increase very rapidly with decrease in space below this level. Then when we got to Alaska, you said that there were 650 to 800 square feet for a family of four people--close to 200 square feet per person rather than 75. Yet, you described this amount of space as very confined. I find this conflicting.

A. Well, you have to remember two things. One, in France we're dealing with a different culture and there are definite problems when you begin to compare cross cultures. I mentioned that we had to be very careful how we compare data from one country with data from another, because people's life styles are totally different. The density that people in Hong Kong, for example, can tolerate would be intolerable here. The other factor is that in the North people are constrained to virtually year-round indoor living, at least the non-natives are, they don't go outside much except for a brief time in the summer. Because of this, the amount of space that would be comfortable for a family of four has yet to be determined.

Q. I wonder if attitudes and habits making up a life style would not be more easily manipulated than the architecture?

A. No, they wouldn't, simply because the problems we get into when we tap attitudes are so formidable. This is a very difficult area to attack, as most individuals who have worked in studies of attitude and personality can attest to. It's far better to attack it from the design point of view. Now, the one factor that seems to run throughout all of this is that if you provide the individual with enough variety, that is, enough choices, it goes a long way to solving

part of the problem. It's when you restrict choices, such as you have in your small communities, that problems arise. I mentioned the Hudson Bay store. In areas of the North this serves as a social center for the women. If you don't have it the women really suffer. The marketplace is overlooked in our culture as being not just a place where you buy things but also a place for social stimulation, for social intercourse. It's very important, we need it. In studying other cultures, anthropologists refer to the marketplace time after time as being something more than just a place where you go buy a pig or a bushel of grain. We seem to have overlooked this, we now put up shopping centers, but they are not really the same thing, they don't serve the same purpose.

Q. In relation to your studies concerning the effects of indoor environment on children, do you find any studies involving mobile homes in the United States which would be comparable to your findings? There are a few things I have seen that indicate that children who are reared in mobile homes sometimes have poor maintenance and motor coordination problems. The child growing up in a mobile home has not had the opportunity to "ad lib" play, as one might say. With a family room you can leave toys lay about; in the trailer, after you've done playing with them you pick them up, put them away, and so the "ad lib" play factor is much reduced.

A. I don't know of any data bearing on this, but your observation is very interesting. I would suspect that, if our first look has any validity, what you are seeing is true.

Q. I'm surprised to hear you say that smallness in terms of town size, is a better idea.

A. Well, I tried to stay away from any value judgments of my own. What I was referring to is the notion which we seem to have that somehow the small town has a nostalgia and a way of life that, at least for many individuals, is better.

Q. I may be speaking for myself, but I think that the population in general, or maybe the Chamber of Commerce, would disagree with you.

A. There's no question about it. Yes. We have just been through this little exercise with our director of planning in Brown County, who, because of the input from the various political factions in the county, has made the statement and I think there is some data to support him, that within the next ten years we will have a population double what we have now, which brings us up to almost a quarter of a million. Now, these kinds of prophecies tend to become self-fulfilling, because what you do is to begin to build larger highways, you begin to build larger areas and people do come in. But then if you look at it from another point of view and say, Okay, let's not build these things, don't build the road, don't build another bridge across the Fox River, then you begin to hear the Chamber of Commerce and others saying, Bigness is goodness; if we can't grow then we're dead. We had a meeting of the Wisconsin chapter of the American Institute of Planners, at our university a few weeks ago.

The director of planning for the city of Madison stated that, in fact, he would always support growth, that growth somehow was good and anything else was stagnation. Now, everyone has his own opinion as to whether or not this is so, but we are reaching the point where maybe we will have to rethink what is good and what is not good.

Q. Where, in your categories, is the child who lives in a suburban area bordering large towns? Would his be more of a small town experience or a large town or someplace in between?

A. We don't have any data yet, but if I could make just one comment, which I hope you won't pin me to the wall for, I don't think he lives anywhere. He is neither fish nor fowl, and I think as time goes on we'll be able to show that this is the case.

Q. How about the oriental way of looking sage and ignoring one's surroundings? Has this entered into your consideration of how people consider living conditions?

A. Yes, certainly. The Japanese use various partititions and usually paper screens. As long as you can't visually perceive someone else then you are private. But for us, of course, that's not the only criterion for privacy. If we can hear someone on the other side of the screen belching or making love or doing other things, brushing their teeth or going to the bathroom, then we're not private. We have to have auditory privacy and olfactory privacy, as well as visual privacy. So again it becomes a question of how you're trained and what your culture transmits to you; it's different from country to country.

Q. Last week I saw a beautiful film on Eskimos living under their former igloo conditions, the intimacy of the home life and the constant play with the children. Couldn't films taken of Eskimos be shown to these people up North so that they themselves could recognize that here is an aspect of living in the north country that they are missing? And wouldn't this advance some of the ways of living which have proved most beneficial to well-being?

A. Yes, you could show them that. They wouldn't change their behavior. People simply don't change their behavior on the basis of that kind of exposure. They bring their own background and culture with them and they don't change.

THE ROLE OF HUMAN VALUES IN ENVIRONMENTAL EDUCATION

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James Swan considers environmental education a reflection of a larger movement toward educational reform. This need for overhaul of educational programs is illustrated by our growing dependence on technological solutions to problems.

A major dimension of an environmental education curriculum should analyze social systems and values, and identify social values of present-day societies and cultures. How do these affect decision-making processes?

Generally, Swan indicates that schools must change their mode of operation and re-define their function in the educational system. Those who work in schools must recognize that school is a socializing institution. Messages being transmitted to students about their environment may be more detrimental to both a quality environment and life than we would care to believe.

Life exists upon Earth due to a complex series of biophysical processes which we are just beginning to understand. Man, uniquely among animals, has not been satisfied with his natural niche and has, therefore, applied his intellectual capacity to develop methods to overcome certain aspects of natural processes he dislikes. The success of man's ability to conquer natural laws is evidenced in our swelling population and technologically advanced society. While in the short run man receives some benefits from his present "apparent" successes, in the long run the picture is not so bright.

To support increasing numbers of humans at the same or increased levels of living will require an increasing dependence upon technological innovations to supplement natural biological processes. For example, if the natural assimilative capacity of a river is exceeded and we do not desire pollution, we build a sewage treatment plant to augment natural ecological processes. Such technological development may provide immediate comforts, but the greater amount of our fate which we turn over to technological processes, the greater chance we risk of suffering ecological disasters if our technology fails. If, for example, we build a giant sewage treatment plant to handle all the sewage from southeastern Michigan we may begin to improve water quality in Lake Erie, but what would be the result if the plant were destroyed by a tornado? Such a disaster

could produce irreparable biological damages.

Residents living next to the Chrysler Corporation's Huber Foundry in Detroit have learned the hard way what can happen when we place all our faith in technology to control pollution. Some four years ago Chrysler completed a progressively designed foundry that was designed to make engine parts in the cleanest manner possible. When Chrysler built the factory in immediate proximity to a residential neighborhood, it spent $2 million to install elaborate air and noise pollution control systems designed to filter out 98 to 99 percent of the pollutants from the foundry's two steel-melting cupolas. During the last six years this system has broken down 55 times. Homes worth $12,000 are selling for $8,000 and $9,000. On one block 20% of the homes are for sale and no one will buy them because of the frequent rains of orange dust and dirt and foul odors which pervade the neighborhood periodically. Further, some residents have suffered from a wide variety of health problems and all have suffered property damage. In 1968 Chrysler settled a law suit for damages brought on by 70 local citizens, paying an average of $550 per family. Today, residents still suffer from periodic breakdowns, and several court actions are pending, although in a booklet entitled "Toward a Cleaner Environment" Chrysler says:

> In 1964 we built the Huber Foundry, the first major industrial facility built by a major manufacturer within Detroit's corporate limits within more than 12 years. This foundry presented Chrysler engineers with major pollution problems at a time when pollution codes were just being written. These engineers, using the pollution abatement guidelines then available, and relying on the guidance of governmental officials, obtained the most advanced equipment which would meet present and anticipated future needs. The Program was successful. (Morris, 1970)

According to area resident Emery Hrabovksy, the successful operation of the plant's air pollution control equipment is questionable. Presently he and 300 people are engaged in a class action suit against Chrysler. Depositions taken to date indicate the following disabilities attributed to the Huber Foundry.

1 - partial lung removal
13 - acute sinus trouble
8 - serious allergy headaches
5 - respiratory difficulties
5 - asthma cases
4 - emphysema cases
2 - eye problems
3 - bronchial problems

Mr. Hrabovsky further states that many other people suffer health effects but have not reported them to their doctors.[1]

The problems arising from the increasing amount of what Toffler (1970) has aptly called "fate control" which we have placed in technology to support our lives can readily be seen with perceptually obvious environmental problems such as the case of the Huber Foundry. Here the solutions lie in the political and legal arena. Unfortunately, however, most environmental problems do not manifest themselves with the obvious catastrophic effects of the Huber case. Instead, most environmental pollution is perceptually unobstrusive, gradually worsening over the time until a crisis, which is often irreversible, occurs. For example, public opinion studies of response to air pollution in Nashville, Tennessee, show that people living in highly polluted areas generally only express concern for air pollution on those days when it is very bad. (Smith, et. al., 1964). The problem here, of course, is that people may be suffering significantly at average daily levels, but because of continual exposure to such levels over time they psychologically adapt to the problem. My own research with high school students in Detroit clearly shows that people who seldom leave Detroit's hazy skies over time come to accept grayish-brown as a normal sky color (Swan, 1970).

Unfortunately, people do not physiologically adapt to polluted air as easily. Recently we surveyed 610 residents of three Detroit suburbs which are subjected to very high levels of air pollution (Swan, et. al., 1971). We found an alarming number of health problems which could be associated with air pollution, such as 17% of the population reported suffering from bronchitis during the last year. The national average is 4%. I grew up in this study area and suffered from chronic bronchitis along with fellow area residents, not knowing that it was at least in part attributable to the nearby heavy industries.

In the immediate future I feel we must call a moratorium on the galloping technology which produces much of our environmental pollution and ultimately leaves us more vulnerable to ecological catastrophes, should that technology fail. Simultaneously, I think we as citizens have the right to know just what we are doing to ourselves and to the environment. My feeling is that as we conduct more research on ecological toxicology we will find that DDT and mercury are only the beginning of a long list of environmental contaminants which are harming us. Looking into a crystal ball a little, I would predict the next round of horror stories will deal with arsenic, asbestos, selenium, and a number of pesticides.

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[1] Hrabovsky, Emery, Testimony: Michigan Air Pollution Control Commission Air Quality Hearing, Pontiac, Michigan, August 4, 1970.

As educators we cannot expect to be leaders in environmental research, yet through applications of existing research techniques we can contribute a great deal of our knowledge to the severity of existing environmental problems. I would propose that every science teacher in this country has the capacity to help his students define the severity of local pollution problems. Not only can they conduct some very basic ecological experiments such as measuring dissolved oxygen levels in a stream or dustfalls in the school yard, but the results of their work can be made even more meaningful if they use more practical monitoring approaches. For example, why not place several different species of fish into samples of water and determine which species, if any are effected adversely by the water quality. Or, why not monitor air by placing a series of air pollution-sensitive plants around the community and study any changes in growth patterns. Or, place specimens of fabrics, rubber, and metals around the community and compare rates of deterioration.

Today there are a number of books on the market which describe some fairly sophisticated environmental monitoring experiments. One criticism of those I have seen, however, is that they never tell students how significant their results are. If you know that your air contains 90 micrograms per cubic meter of suspended particulate matter, that doesn't mean very much if you don't know that annual averages of that level will increase your likelihood of contracting chronic bronchitis. I might add that this failure to relate results of environmental monitoring to personal effects is also a common fault of most regulatory agencies who apparently do this to avoid controversy.

Another useful experiment would be to keep class records of all respiratory diseases which students contract during the year. This data could then be compared with that collected by other "sister" schools and then compared with differences in air quality to see if there are any differences. This sort of study is simply not being done right now because of the difficulties of collecting statistics on morbidities. At the end of the year, I would hope that students would then submit copies of their reports to local officials to raise questions about air quality and their health and property.

Recently the International Joint Commission on Air Pollution held hearings in Detroit to consider problems of the area. One commissioner asked the Mayor of neighboring Windsor if his citizens would prefer to have $200 in their pockets and have the same quality of air as now exists, or have that $200 spent on improving air pollution problems. The Mayor's answer to that question should have been, "until you can tell me what are the costs of air pollution I don't think I can ask my residents to make that decision." If we begin to document the costs of environmental pollution in our classrooms I think we will definitely increase public awareness of

the magnitude of the problem, because for the first time citizens will have a much better list of the costs of our present actions.

As we gain a greater understanding of the extent of ecological, physiological, and economic damage which we are suffering, some of us will become increasingly concerned. I want to stress the word some, for not everyone places as much importance on knowledge of the relationship between air pollution and human health. To some, pollution is the price of progress. The fact that knowledge that damage to oneself will result from an action does not always lead to behavior which will alleviate that problem is easily documented by the large number of people who continue to smoke cigarettes, despite the convincing evidence that smoking causes serious health problems.

Initially we have seen widespread popularity for the "ecology movement," which has produced some important short run improvements, such as the defeat of the SST and several cities banning high phosphate detergents. After a few such victories, however, I feel that preservation and enhancement of environmental and social quality will not have such resounding support. For the present, many engineers will be laid off by less money for space programs and the defeat of the SST. These people, and many others, will not be as enthusiastic about environmental quality as you and I. The lack of Blacks and other minority groups in the ecology movement also indicates their different priorities. If someone has been denied access to economic and material wealth all his life and he is just beginning to see that he might get some, he's not going to be very receptive to cries for decreasing levels of consumption, or closing down plants that don't comply with pollution control orders. One of the biggest problems of the "ecology movement" is that its followers seldom stop to consider why certain people might oppose anti-pollution programs for rather good reasons.

I have purposely raised this point about differing values. The environmental crisis is not an accident. It is the product of a complex series of human decisions. These decisions are in turn based upon consideration and evaluation of information, the importance of which is determined by our values. In the short run we will make some gains in environmental quality from technological solutions like tertiary sewage treatment and placing catalytic converters on automobile exhaust systems. In the long run, however, such gains will be offset by population growth, increasing levels of consumption of resources and energy, and the general technological explosion, unless all of these trends are reversed. The reversal of these trends will call for a radical change in our present social system and its underlying social values. For a moment, let us look at this society of ours a little more closely. Reviewing research on the American culture, Williams (1963) identifies our present major social values as:

1. A central stress on personal achievement, especially secular occupational achievement. The success of this achievement tends to be measured in economic and material terms.
2. A desire to dominate the world of nature, to subdue and exploit the surrounding world.
3. An emphasis on the merit of work for work's sake alone.
4. The presence of a strong concern for a strict moral code, which has been termed "moral overstrain."
5. A strong emphasis upon efficiency and proficiency.
6. Compartmentalized humanitarianism -- giving to various charities, as opposed to generalized giving.
7. A reverence for progress.
8. A preoccupation with material comfort, especially those things which provide effortless gratification.
9. Williams observed "in so far as a group or society is able to attain a high plane of material comfort, it will tend increasingly to emphasize 'hedonistic values' unless checked by internal social danger or outside threat." (underline is mine)
10. Avowed equality.
11. Verbal proclamation of freedom.
12. External conformity (faddishness).
13. Great faith in the power of science and secular rationality.
14. Strong nationalistic sentiments.
15. Strong concern for individualism and an aversion to the invasion of an individual's integrity.
16. Prevalence of culturally sanctioned attention to something called democracy.
17. The ascription of value and privilege to individuals on the basis of race or particular group membership.

Examining these values should give us some insight into why we are in the present mess we find ourselves in. Rather than seeking satisfaction through spiritual and human channels we seem preoccupied with economic and material gratification, which generates voluminous quantities of waste and requires large volumes of resources. We

proclaim certain principles like freedom, equality and democracy, yet in real life pay more attention to personal gratification than concern for society and other living things. This set of values produces acts like littering and industrial air pollution. In some cases, we even purposefully discriminate against others. The worst pollution occurs generally where the poorest people with the least political power live. In such cases, pollution is an act of social discrimination.

The thesis which I offer to you, therefore, is that at the very heart of the environmental crisis are the social values which have produced our current society. If we want to resolve pollution, we will have to change social values, and undoubtedly, the institutions which reflect them.

At the risk of sounding like a prophet, I would like to propose the following social values to replace some of our old values which I feel are the basis for our environmental crisis.

I feel we need to increase our reverence for life so that individuals will behave in a manner consistent with the preservation of diversified communities of living things. Our lack of concern for other living things and their role in ecological cycles has led us into many of the ecological problems we face today. Western farmers are troubled by prairie dogs, so some spread 1080 (sodium triflouracetate) and kill many living things. Why are prairie dogs abundant? Because we have killed off many of their natural predators, such as the coyote. We know that the most stable ecological communities are generally those with the greatest diversity. If we valued diversity more, then we would be more tolerant of dandelions, coyotes, and crabgrass, and suffer much less pollution.

We are a society which reveres the past, lives in the present and fears the future. We must reverse this trend and develop citizens who are more considerate of the future results of present actions. This means we must develop tolerance for uncertainty, and patience, rather than continuing to maximize present personal gains at the expense of the future.

Many of our environmental problems exist because no one has ever wanted to seriously do something about them. Rather than provoke controversy, we have developed tolerance for injustices so that we might minimize personal sacrifice. The resolution of our environmental crisis is going to require the collective effort of most Americans. We must develop a strong sense of obligation to participate in collectively solving the problems of society if we ever hope to survive in the long run.

Finally, we must develop a reverence for the ecological processes which support life. This means that if we must develop an area, development should proceed according to the natural life support systems of the environment, as Ian McHarg (1969) has proposed. In some cases we may find it necessary to develop technological

procedures for assisting natural processes, such as providing sewage treatment plants, and recycling garbage. Such technology should, however, be designed to supplement nature, not dominate it.

This list is not meant to be all-inclusive, but rather to stimulate you to expand upon it, alter it, and develop your own recipe for survival. Simple intellectual discussion of values, however, will mean very little unless these values are internalized and in turn channeled into the production of social change. This will not be an easy task. Our school systems offer an opportunity for development of new social values, but their present structure and function is such that they are not likely places for changing values. The traditional model of education in our public schools was developed back in the days when the principal functions of schools were to convey information, and develop discipline. Youth today are rejecting these educational techniques as not in keeping with social needs. If environmental education is ever going to be successful in resolving environmental problems, then it must address itself to problems in a relevant manner. It must delve much more deeply into the processes of human motivation, behavior, and attitude formation and change. Conveying factual information is important, but only after the learners can see its worth. This calls for a series of different approaches to education than currently predominates in our public schools.

Many environmental problems evolve over long periods of time from the collective interaction of many seemingly innocuous actions. It is extremely difficult, therefore, for the average person to see how he personally relates to many environmental problems. Recent research, for example, has shown that while many people will agree there is a population problem, few recognize its relationship to personal family size (Barnett, 1970). Traditional classroom teaching techniques are not appropriate for dealing with such abstract concepts. More appropriate are such techniques as games and simulations which allow condensation of both time and space. The role-playing involved in many games further helps to develop personal appreciation for the feelings of others which you may personally not appreciate. For example, when white middle-class children play the role of black inner-city residents in gaming simulations dealing with planning, they frequently report feelings of frustration and anger when they see their powerlessness.

I would further advocate the implementation of classroom techniques for developing basic human values such as trust and respect for others. Games and simulations will help here too, but I feel we must explore such techniques as are sometimes used in human relations work. I am not saying that every fifth grader should undergo sensitivity training, but rather that many of the exercises used to develop trust as a basis for human relations work might be used as part of environmental education. For example, children might be given more problems that require group effort for resolution such as

are used by the Outward Bound wilderness schools to build group spirit and trust.

We must also strive to develop citizens who recognize their interdependence with others and feel some social responsibility to others. One result of our affluent, mobile society is that the people with the greatest political, social, and economic capacity to improve society now more than ever before can most easily escape from the problems of society. Not only does the national cult of escapism represent a drain on environmental problem-solving, but it is also currently rapidly leading to the destruction of many of the few remaining unique natural areas of this country. One need only note the traffic jams in Rocky Mountain National Park, the neon nightmare of Miami Beach, or the polluted trout stream that runs through Aspen, Colorado, to see this happening.

I think one way we might begin to cope with the problem of escapism would be to develop student exchange programs where students would have an opportunity to live outside of their home communities for a year or so and gain an appreciation for the lives of others. Traditionally, many outdoor education programs have taken children from the city to see the country and then taken them back to their polluted worlds, leaving them perhaps somewhat frustrated that many of them don't have the money to return to clean air and water very often. I think we should also design urban resident experiences for rural and suburban children so they can gain an appreciation for the lives of others and recognize some basic human interdependencies.

We must also work very hard to develop a sense of efficacy for coping with environmental problems. We can make people aware of environmental problems and their dire consequences and still not motivate them to resolving the problems if they do not feel they can play a role in resolving these problems. Games and simulations can help out here too, but only to a point because they are not the real world. I strongly feel that a logical outgrowth of any environmental education program is the actual resolution of community problems. This is what relevance is all about. Recognize the problem in one's lifespan, recognize why a condition is a problem, explore alternative ways of resolving the problem, and then go about solving it.

Let me give one example of relevant problem-solving. In an inner-city school one of my students wanted to have her biology class study pest control. Looking for examples of pest problems nearby, they discovered cockroaches in the school. She then posed a problem, how to control them. Students sought alternatives -- chemical control and biological control. They then explored the alternatives and experimented with finding ways of limiting appropriate food, water and shelter for cockroaches versus various chemicals. In the long run they found biological control was more effective, safer and cheaper. This was a relevant learning experience, which also solved a community problem.

In choosing problems for each study it is important to identify ones which students can have some impact upon, such as cockroach control, rat control, litter pick-ups, or glass recycling. If, on the other hand, the class focuses only upon massive problems such as regional air pollution, where the individual citizen does have little impact, it is easy to build up a sense of well-informed futility (Wiebe, 1971). A student could learn the tonnage of pollutants placed into the air daily, become aware of the multiplicity of sources, and some of the effects and throw up his hands in frustration because there is little he as an individual can do. I am not advocating that one shouldn't study regional air pollution, but that one should begin with attacking local problems and working toward their solution. If people can solve local problems they will develop a sense of personal efficacy which will lead them to be more interested in becoming involved in larger community problems.

Perhaps some people would object to my advocation of teaching values and attitudes. Let me first assure you that it is impossible to have a human interaction when someone does not try to influence someone else. Research on subjects such as political socialization has clearly shown that schools do have a profound influence on children's attitudes. Environmental education should recognize this and design programs purposely aimed at the formation of attitudes and values. Notice I said formation of attitudes and values and did not say dictating what attitudes and values should be held. Too often our schools only give one side of the issue. Environmental education should attempt to provide youths with all sides of an issue and the consequences of each alternative. This is not to say that environmental educators should be objective, they certainly can become advocates, but only after clearly explaining why they take a position and that they recognize people may hold different views based upon different value judgement. Schools are important socializing units and it's about time we started recognizing this and maximizing their potential for prevention of environmental and social problems.

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EDUCATION AS ENVIRONMENT

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John Steinhart examines environmental education within the broader context of an educational philosophy. What kinds of environmental messages do students receive every day in formal educational endeavors? Are the bulk of these messages contradictory to an environmental education which fosters a quality of life? Educators need to recognize the kinds of subtle environmental messages they convey daily. Steinhart indicates that attitudes and values develop early and cannot be counterbalanced by a mere series of courses, outdoor activities and community involvement.

Steinhart suggests some different curriculum and instruction efforts. He feels that communication patterns should be examined. More emphasis needs to be placed on providing for student choices; more opportunity for students to interact with the environment.

The content of education is the message a student gets when this process is over. If you were able to look inside the brain, neuron by neuron, and ascertain what it is that student went away with, that would be the content of his educational program. It doesn't matter what is written in the syllabus or in the catalog or anywhere else; only what is recorded in the student's brain about what you said or what he did makes up the total content of the educational program. Consider your own education--not so much your own teaching or the books you've read about it, but your own education--and try to ascertain what message it is that you carry with you. Almost all of us are persuaded that somehow our case is special, that those other people don't respond that way, that students are different than they were in our day. I think there is some good evidence that they are, but I would submit that that is the way it has always been--other generations are always different.

As the title of this talk suggests, education itself is an environment. It might be interesting to see what kind of messages a student gets from his educational environment. Remember that about half of your waking hours, from the time you're 4 or 5 until you're 16 or 20 or 30, are governed by your status as a student. Only a fraction of this time is spent in actual studying, or in the

classroom or engaged in something that passes as an educational experience; but the large portion of your personal relationships, your societal relationships, are also governed by your status as a student. John Maynard Keynes said that not many people become enthusiastic about new ideas after they are 25 or 30 years of age. So it is a very important portion of your life that is governed by your status as a student. I would like to look then at just what kind of messages about the environment a student gets from the educational system.

Messages from the educational environment... I had a nice one brought home when one of my children started kindergarten last fall. She came home on the second day and was conducting class for the 4-year-old, who was much into the idea of going to school. The new kindergartener informed her sister that on the second day she had been in school she had learned a new word. The word was "silence," and it means Keep Quiet. That was one of the first real messages she had received. In that educational system--at least at the elementary level in that school with that teacher--one of the messages was "Don't talk." These are alienation methods--and you see them all too frequently. Parenthetically I should remark that what I am saying does not apply to the very, very able students. They have their own collection of problems, but they seem on the whole, immune from damage by education. At least at the graduate level in the physics department, when you get one of these truly bright students, you don't really teach him anything, you just get out of his way. On the whole you don't produce really outstanding students, you just get them, and try not to ruin them.

Another unfortunate message from the educational environment is that "Ordinary life is of no interest." Someone remarked that he couldn't understand why so many people spend so much time knocking ordinary life, since it was the only kind they had. I submit that we tend to do this very much in the educational system. We talk about the great notions of Civilization, the great notions of Mankind. What we mean by these words, of course, is the remnants we have left of Greco-Roman-Judaic tradition, which we regard as the center of knowledge. If we're to believe this, then we currently are a pretty barren civilization. Somehow we seem to forget what the lions were saying to the Christians.

A message that goes with the preceding is: "Your physical surroundings are unimportant." How many of us went to a school that was a three-story institutional structure, with classrooms that were so predictable you could have been transported from one school to another without ever noticing the difference? Like an older-generation Howard Johnson's--everything is exactly the same. We are getting away from that a little bit, thank goodness.

Another message coming out of the educational system is: "Above everything, let's have order." I submit that one grows Presidents like our current one under these circumstances, and certainly our present Attorney General. For them, the subject of law and order

seems to be an independent entity--no connection with anything else. I submit that order is important, but if the search for order exceeds all else, then we are conveying precisely the opposite message that most of us would like to think we are talking about when we are engaged in this process called education.

Together with this last one is the "Do not question authority" message. It comes across very strongly. How many of you with children have had the experience of telling them something for years, and finally when the teacher tells them they believe it? What is happening here is something that you ought to be a little bit concerned about. What it tells you is that you have a somewhat better relationship with your children, a somewhat more human relationship, and the teacher is being accepted as an unquestioned authority. Under those circumstances, a child is likely to wind up regarding education as an immunization routine--that is, you are inoculated with it, and then you are forevermore immune and need not take it again.

Another message is that "Emotions are meaningless and are to be suppressed." We talk very little about this in school, but, except for a few experimental ones, we try as vigorously as we can to prevent emotions from entering into the procedures of the classroom. Yet, we have a society where, increasingly, if we could only give safe vent to our emotions, it would be much easier. Unfortunately, we are stuck with our repressions and, particularly for young people, this idea of suppressing emotions and considering them an irrelevant topic educationally is a continuous message over a period of years. This is not likely to produce adults that I would want to have much to do with.

Among other messages are: "Don't learn anything about leisure or play--after all these are vaguely sinful." I mean, would you really go out and have fun just for the hell of it? Just because you wanted to? In a society in which leisure time has grown much, much faster than our ability to find anything to do with it, this is certainly a wrong message. On the one end we have the people who have never learned what to do with leisure at all, who consume an enormous amount of television and feel rather unhappy with it.

What I've said so far has nothing whatever to do with the syllabus, nothing whatever to do with the content, nothing whatever to do with the subject matter--and yet the messages I'm talking about are persistent. They go on grade after grade, year after year, until eventually, with a considerable sigh of relief, we say, "I'm finally getting out." If the aim is always to get out, then that in itself is an indication of some of the kinds of messages. Concerning the environment--here it's a matter of point of view, rather than a subject matter--all these messages become messages about the environment: how you should relate yourself to the environment you find yourself in, how you should regard your fellow creatures of the same species, and how you should regard the physical surroundings of the rest of the biological community.

The schools do not carry the sole burden for these kind of negative messages--we have plenty of other ways in our society of communicating them. A recent book, Philip Slater's Pursuit of Loneliness (subtitled, American Culture at the Breaking Point), analyses some of our present difficulties in society. I submit that no one course, no carefully chosen syllabus, no walk through the school forest, or no summer working out-of-doors is likely to counteract 12 or 16 to 20 years' worth of continuous negative message--conveyed not directly so you can challenge it, but accompanying the content and syllabus aimed at specific subject matter.

What about some of the other messages that get transmitted and over which we don't have much control? We have known for a long time that an enormous amount of learning that takes place in college and to a significant degree in high school, is done in the peer group. That is, an enormous amount of stuff that you take out with you has to do with the interactions of the people in your own age group. Occasionally we try to penetrate this a little, to deflect it towards reinforcing those things we think might be worthwhile. And occasionally some of this is achieved. One can see in a visit to Oxford, for instance, a considerable absorption in learning going on--far more than in the American university of the mid-1950's, where talking about anything other than sports or girls (if you were a boy) or boys (if you were a girl) was moderately unacceptable socially.

There are a lot of messages given by the environment, though, that make an impact on the student. During these last couple of years, the demonstrations, the political activity, the extracurricular objections to society or the university--these have been an enormously important message. A street demonstration is a complicated form of cops-and-robbers game, in which the issues are lost in an Us-and-Them game, with tear gas and rocks and all the rest. Again, this is an enormously powerful message. Are you such a good lecturer or such a good teacher that you can overwhelm this message with one hour's talk? I doubt it. And can you ignore it entirely? I submit that that is a dangerous practice too; whether you ignore it or not it is making an enormous impact on the students with which you deal.

On the other end of the scale is the message of a spring day. Yesterday I was teaching my course, which is attended mostly by seniors and graduate students, and it was a beautiful day. You could see what was happening to a good many of the students. Well, do we ignore it or don't we? Ignoring it causes us considerable difficulty, because they are getting a lot more messages from that spring day outside, particularly if you have windows in the classroom, than you can give them in that same hour. We can go on and on, there are messages from all that the students do: fun, sports, love, drugs--all of these things go on. They are mostly forbidden subjects in the classroom. Should they be? Well, I don't know. They are part of the environment, and if you are really talking about the environment and how you relate to it, perhaps you must talk about whatever the students are bothered by.

There is a way out of this. The way out, of course, is to turn these unwanted messages off, to persuade the students that what they feel and what messages they receive other than from you have no meaning, that these outside messages are unimportant and kind of sinful. That is an ultimate adaptation. And when you start trying different kinds of open format, when you begin to have the students talk openly about what bothers them, then you will find that many of them have made that adaptation, to a point where they are really very suspicious of talking about the things that are preoccupying them the most at that particular moment. Probably the worst risk of all is in succeeding, over the course of years, with this continual low-level drumming message of turning it off--turning off the concern for the situation in which you find yourself in real life.

Some of the most innovative things that are now happening at the university level are happening in community colleges and junior colleges--mainly because they are not trying to grow to be Harvard, Oxford, or Cambridge. Having given up that idea, they have little self-consciousness about all the mythologies that we have put together over the years. We claim we are after truth and meaning, and yet for the most part we run vocational schools. There are very large numbers of students who somehow assume that if they endure, if they can withstand the Chinese torture-drop requirements, this will add just that much more to their future annual incomes. Well, fine; but somehow I can't get very enthusiastic about that process. I don't mean that we have no need for vocational training--we do--but it is a shame to have vocational training and then talk about it as though it were some higher operation of human beings trying to understand what has plagued mankind for the last two or three thousand years.

We talk a good deal about standards in education. Who sets these standards anyhow? Do we have standards set by society? By other faculties? By our students? By experts? Well, we have a contribution from all of these groups right at the moment. The question that always comes up when you start changing things is: What will happen to the standards? You mean standards for the Some of Us? Or the standards for the message the student gets? You mean the standards for the content of your lecture? Or the process by which the student hears it? These questions can become more dehumanizing than any subject matter, no matter what it is.

What about rationality versus feeling? If there has been a difficulty in our understanding of political science, for instance, it has most often been our desire to believe that people behave rationally most of the time. In the face of continuous day-by-day newspaper accounts, that belief is hard to maintain. Most people in the day-to-day pursuit of life exhibit a very large amount of irrationality. We call it feeling, emotion, or a lot of other things, but it is irrationality in the sense that it is not a clear-cut rational process which could be written down in straight-line form, terminating with a decision. We can construct the decision-

making models and they work well on computers, but they work terribly with people, particularly individual people.

What about objectivity versus subjectivity? We have known since at least the turn of the century, from physics if nothing else, that the universe is not subject to an exact law. Formerly it was thought that it would be possible to understand this piece of machinery in sufficient detail that we could give it a kick in the right direction and it would run beautifully forever. How else can one explain Karl Marx, who was a reasonably bright fellow, coming up with the absurd notion that if somehow you set up his ideal kind of political system then the government would wither away? That's an absurb notion on its very face. We have given that up, yet lurking in most of the educational system is this idea of objectivity: that somehow you can separate the "in here" and the "out there" so completely that the "in here" has no connection or influence over what you perceive "out there." We know this to be false, that in fact you interact with the people you observe. You can't even find the position and velocity of an electron uniquely--even something as mechanical and seemingly objective as that. We know these things and yet they don't enter into the way we proceed.

What of expertise versus conviction? We have in our modern society the idea that if you get the right experts together you will be able to solve any problem. If I have a quarrel with some of the television coverage of environmental issues, it is that they wind up with the television flashing to the laboratory, and there I am at my bench, and I look up solemnly and say, "yes, it is a very serious problem, but we've been doing these experiments and we think that we may get a breakthrough in a year or two." And the viewers on the other end of the tube say, "Phew, I really thought we had a nasty problem there, but I'm glad those fellows are working on it." Somehow we escape any real need to face the basic intricacies of a lot of the issues of life by passing them to some expert who is going to tell us not only what toothpaste to use but how to straighten out the cities. This may work all right for the toothpaste, but forget it for straightening out the cities by expert advice alone.

I submit that the methods of education don't matter very much, at least not in terms of the outcome. When you look at the schemes used in Japan or Korea, in the Soviet Union or Germany or France or Italy, can you see that much difference in the kinds of students produced? On the whole, students are surprisingly durable individuals, and the funny little curlicues we put on the top of everything that passes for educational innovation are not very important. So experiments ought not to scare us very much; what ought to scare us are these underlying messages that are passed out all the time, quite independent of what we intend to convey.

Most of you believe, as I do, that we are in serious trouble with our environment. Oh, perhaps we won't meet extinction in three to five years, perhaps it will come in three hundred to

five hundred years. But isn't there in your vision and mind a notion that we managed to make it through two or four or six millennia, for which we understand the history at least a little bit, and we would like to be around for the next two or four or six? We clearly can't manage this the way we're going at present. So I suggest some fundamental changes, and one of the places we are going to have them is in the educational system.

Let me remark that this talk is kind of a Level One communication. A Level One communication: I talk, you listen. Well, I talk whether you listen or not--that is the way most education is done, after all. I see some of your faces, and I get some feedback from that, but that's a very unsatisfactory kind of communication. There's a lower level, there's a level of zero communication. That's what happens at cocktail parties. You say, "I'm sorry I'm late. I stopped and murdered my grandmother." He says, "Oh, how nice you could come." That's Level Zero communication: we just take turns talking. There are higher levels that are occasionally achieved Dialogue might be called Level Two communication: I talk, you listen; you talk, I listen; and I learn something about what you understood me to say, also something of what you feel and what you think and what it is that bothers you and why it was you didn't understand what I tried to say. But even that level is not as far as we would like to go, and here is where the environment comes in. A dialogue is normally conducted between two people who regard the environment they find themselves in as fixed. I don't mean just the physical setting, although that can be enormously important--it can be enormously important if you are a student standing in front of my desk and I am head professor Dr. X sitting behind my desk. But there is the kind of higher dialogue that goes on in which you are able in some sense to shape the environment in which it takes place, to have some say about what the ground rules are, about what kind of communication you undertake.

Now, I am beginning to hint at something that is fairly radical, although by no means new. This is, that the student might well decide that his education has been conducted in a lousy manner, that it's time to do it another way. And assuming that it is not illegal or immoral or fattening, why not? So if you would like to operate at this Level Three, where you get some feedback and have some dialogue and you can, at least in some small way,change the environment in which it takes place, then you've got to enable the people participating--faculty, students, whoever--to structure their own environment. This is, in a way, the idea of the open schools in England, although it is not usually described in precisely the words I've used. On the whole they don't appear to be damaging students any worse than by anything we do here, and I think they're doing a lot better than that, from what I've seen and heard.

Carl Becker of Northwestern has a scheme that I think might work pretty well at the university level; it is called tree-plan. All

you do in the tree-plan is hire the faculty and they agree that they agree that they will sit under a certain tree at certain hours and talk to anybody who comes by. The beauty of this plan, as Becker points out, is that that's it in its entirety--no committees, no curriculum, no course work, no degrees--that's all there is to it. It sounds a little platonic, perhaps, and I agree it would be a bit difficult to implement, for political reasons, to say nothing of the fact that the faculty might feel rather uneasy. And here in Wisconsin you might have to agree to have your tree only figuratively, so that you could sit inside at least during certain times of the year. Nevertheless, I think that this is the kind of thing we are aiming at.

Now, how do you implement anything like this in the real world? Well, first of all, you go around and look at the community in which you find yourself and you ask, "Who are the experts?" That is, whose opinion do you need if you want to investigate some particular question? On the whole the faculty are the experts on ideas, at least when dealing with ideas that are new to the students. On the other hand, if you want to know what's going on, what things are happening, how the ideas are coming across, whether anybody is finding out anything, then you're going to have to go to the students. They are the only ones who can tell you. Now, how you find this out is another matter. If you stick with multiple-choice exams and hand out the form "I like this coures--yes or no," you are not going to find out very much, because you have already decided what information you consider admissible. As an example, at the Office of Economic Opportunity there was a study of welfare projects, in apartments erected for older people. First they submitted a very formal questionnaire, asking what is it that you would like to have changed, and what problems have you, and what kinds of assistance do you need. The result was a bewildering variety of petty complaints. They went back later with another questionnaire, simply asking what was bothering them. What was bothering them was that they were lonely, and they were old, and they didn't have much to do, and they didn't think young people wanted to talk to them, and they just generally felt alienated.

The situation is exactly analogous to that of students. You need to find out what it is that is bothering them and start from there. If you can't do this, then their attention will be drawn mainly to what it is that bothers them. It seems to be a perfectly obvious human reaction and one I have all the time, no matter what the surroundings are. To some extent I am better conditioned than they are. On demand, at 11 o'clock on a Tuesday morning, I can stand up and give a lecture. But if my foot really hurts from last night, I would be sitting here allthe time thinking about how my foot hurts.

We had a summer course on educational innovation last year--eleven students and three faculty members. It was one of the most intensely involving experiences I've been through in recent years. I'm not sure that I learned a whole lot new about education, but I

learned a whole lot about particular people and the kind of things that were bothering them. And from it we may have gained a few specific ideas to try, which will form the next experiment. I have to report that some aspects of the experiment didn't work. But what do you expect? We'll try it again, do it a different way.

Society is probably the best expert on norms, and we must live by some norms in whatever society we find ourselves. We are going to have to live somewhat uneasily with the society norm; since universities have always had a leadership role in changing those norms, there is an inevitable conflict. But how normal do you want to be, after all? Do you want to produce plastic people? I sit in faculty meeting after faculty meeting listening to people from the engineering departments say, "Well, but what industry needs is..." What do I care what industry needs. I'm sure the students don't care what industry needs. They would like some kind of dignity and meaning and satisfaction in their lives, and if it doesn't happen to be what industry needs at the moment, too bad for industry.

Unfortunately, in the university today, we prepare people to become copies of their major professors. The content of an undergraduate education is for the most part a preparation for graduate school, and in graduate school you learn to be as much like your major professor as you can. This was not necessarily bad when that small segment of society went through the process and could in fact grow up to be their major professors. At the moment this is impossible. So we must have some other options.

I object to the empty-bottle theory of education: they ship us these bottles and we fill them up and they are capped at the appropriate time and that's that. I'm arguing in favor of something which is more process-oriented than content-oriented, because there is not too much content from my undergraduate education that I can even remember, although it had an enormously significant influence on my life later on. Not by way of content but by way of process.

Basically, we educators should be striving to put ourselves out of business. We have this vision that the students are going to leave and that they will take up the process of educating themselves, that that process will go on and on--you've got to have some more, you've got to learn some more, you've got to learn about this, you've got to read that book. This is precisely what we are after, and somehow we must surrender this process up to the students along the way. Will it ever happen? All too often, education is something that somebody does to you, and when they stop doing it to you it stops happening.

I suppose we really do have to ask what it is society needs, but not get hung up on this as though society were some objective thing out there for which we are supplying spare parts. What society needs--at least what the educational system can contribute--is a kind of person with the attitude that he can in fact have a life that he will find satisfactory, and education must give him some

idea, not of how to do that, but of how he might go about learning to do that.

For the most part we don't need more experts on specific environmental matters--right at the moment we have a great many more answers than knowledge of ways to implement them. You name a problem, and it is easy to suggest a solution that would at least help, but doesn't get implemented. These solutions don't get implemented because society isn't made up of the kind of people who are ready to either accept or support the changes that need to be made to solve our problems. I think the real risk is that some of the writing of Ivan Ilyich may turn out to be more right than we suspect. That is, the universities, the secondary schools, and to some extent the primary schools may be in danger of becoming museums, with the teachers and faculty as the exhibits.

I'd like to describe one of the things we have tried to do. We have set up an elementary, unstructured course in the environment deriving largely from the experimental group last summer. It has been enormously popular with the students, and a danger which arises is that we start getting people who look for an easy route through. Those people haven't gone away, and they won't until there are some fundamental changes in the education system. A few of those who appear just looking for an easy grade can, in fact, be reached by saying, "Look, I've given you a grade. I don't care whether you learn anything--that's your problem, your time, and your money. But we are here to talk about some things that interest us, and if you're not interested take your good grade and go away." I think these people make up an insignificant fraction--which I regard as a great step forward--but some of them are far too alienated for one course or one experience to shake their conviction that the whole of the educational process is one big bummer and you've just got to endure it.

The course has lectures, which are designed as purely supplementary material for the students to attend or not, as they wish. Nothing new about that, the system has been used at many universities for many years. Attendance varies, it depends on who is talking and about what. A good deal of use is made of so-called modern techniques: films, mixed media, and other things. I think it is easy, however, to get too hung up on the technology being used, and to regard the introduction of films or multimedia or rock music or whatever as your bow to modern times.

In individual sections of the course, which is where the focus is, it is a fairly unstructured affair. We have tried to move out of the classroom, where chairs are bolted to the floor and a formal setting. Many of the sections meet in people's homes, because there aren't very many environments that kids feel comfortable in and around a university, where economy of construction is the first requirement of a classroom. Sometimes they get rather unruly, but at other times things go on in ways you wouldn't quite imagine.

I've had classes that were scheduled from seven to nine in the evening that were still going on after midnight, and I simply had to leave for home.

Kids put in enormous amounts of time. Two girls that I had in the section last semester, whose previous brushes with science had been absolute disasters, approached the course kind of tentatively, but became so involved in rushing around reading books and talking about thermodynamics that they wound up writing a children's book on the population problem. It is absolutely exciting. They've been out testing it in the elementary schools, getting kids to draw illustrations--one of the girls is an art student--and they now have produced 30 colorplate illustrations. I hope they will be able to actually publish it.

Along with this there have been some disasters--that is, students who I don't think learn anything. They may have had some experiences that meant something to them; I can't be sure about that. In physics courses that I have taught, I expect that 10 or 15 percent are going to get either D's or F's. And they get D's or F's because they haven't learned any of the stuff that is in the syllabus. I know that a large number of those who get C's get them only because they play the game pretty well and they can remember the material until just after the examination instead of forgetting it just before the examination. I cannot guarantee that half or more of the students have learned anything. So I don't feel apologetic at all about some of the failures we have had in our new course.

We now have proposed a new curriculum--essentially a design-it-yourself curriculum. It will be possible, if it is approved, to elect an environmental curriculum by putting together whatever the student finds interesting. If a student puts together a bunch of things that don't appear to be closely related, maybe I had better not dismiss it but see if it doesn't make sense. All I have to do is persuade at least one of the faculty that the student is not crazy, and then he can go ahead and make up his curriculum. On the other hand, of course, it is possible to insert any of the degree requirements, from any of the departments, as a strictly professional preparation. A design-it-yourself curriculum, with only a check to find out if it's pure nonsense and is not simply a waste of everyone's time. How do you determine this last? I don't know, but you play it by ear and try to understand the person you're dealing with well enough at least to know that he is not a fool.

Related Questions and Answers

Q. Where is this new curriculum proposed?

A. This curriculum has been proposed under the Institute for Environmental Studies, which has no department--it is a separate

unit with the authority to have its own faculty, its own course work, its own curriculum. It's not supposed to rush out and recreate a whole new college--that would be nonsense. If courses already exist which are useful, and if the desired faculty already exist in other departments, than they shouldn't be duplicated elsewhere in the university.

Q. What do you call your new course?

A. I'm so delighted when I can get the students interested in any of the things that I understand, I don't care what I call it anymore. The thing a student is asked to do in this particular course is to work on something that winds up being called a project. That involves him in doing something, and of course a few elect to do a research paper in the library, because that is principally what they know how to do. But many of them go out and do non-library stuff. We do have a number of field trips, which vary somewhat from section to section depending on interest. There are about four trips for the whole course, and there are a number of others that individual sections take on. That's the kind of laboratory work we have. I don't have much sympathy for basic lab work: for the most part it's Mickey Mouse and everybody knows it, teachers and students alike.

Q. Do the students do anything they wish?

A. No, you don't let the student go off in any direction whatsoever without some corrective advice. If I'm there as a teacher I've something to say too, and I will express my opinions about what's going on. I submit that if you are reasonable and honest with the students, they will conclude--though they may not like to admit it out loud--that there is a good deal that you know, and that one of the reasons they came into the course was to find out how to make use of that knowledge in ways that make sense to them. If they go wandering off in some direction that I don't know anything about and am not interested in, I simply say, "You're going off in some direction that I don't know anything about and am not interested in. If you want to hold the section by yourselves and go ahead with this topic, why don't you do that." You are playing it by ear. This doesn't mean you withhold participation just because you must surrender a little of your authority and get voted down once in a while.

Q. About this tree-plan, I have a feeling that we ought to know exactly who has been climbing this tree and what his ancestry (i.e., background and training) is. The image used here evokes a lot of interaction among primates.

A. First, I did not mean to imply, if I seemed to, that instructors should not be college trained. I don't know that anybody has been irreparably damaged by a college education. I would find it very difficult to teach large portions of the material that I do had I not had some formal education training along the way. I see some

shortcomings in it, but I don't by any means conclude that it was all wasted. Second, I don't think one needs fear interacting with students--or any other human beings--as other animals. We are, after all animals; we sometimes like to ignore this, but it's true. We happen to be an animal that is a very peculiar kind. Our one specialization is that we have a forebrain which enables us to do a lot of things and allows us to avoid more specific physiological specialization. The fact remains that we still have a lot of irrational reactions to things, and this ties us very closely to the other animals.

Q. What are your reactions to the new course?

A. I think the most significant feature of such a course, in terms of contributions to the future, is the way the students wind up feeling about themselves and the environment. I do not, on the whole, think that students--while they remain students--are likely to solve the environmental problems. If the whole of adult society, with all its range of expertise and political power, can't solve them, I doubt that students, although they have to be encouraged to work on them if they wish to work on them, will solve them. But many do try. For instance, one of the students was the campaign manager for a recent student candidate for mayor. He sweated bullets writing a position on the environment, since this particular candidate was depending largely on that for his appeal to voters. The campaign was a decided flop--he got 150 votes or something like that. But he learned an enormous amount about the political process, and because he was a full-fledge candidate, he got the chance to see all the shortcomings, the good parts as well as the bad parts, of trying to put together a politically viable program.

Another student in one of my sections last year put together a can-and-bottle drive for this new recycling center on University Avenue. He succeeded in getting a community organization set up, which, the last time I knew, was still going. He had both to get the community people to work together with each other, and to arrange some sort of common pickup for this can-and-bottle recycling. That's a different kind of operation, but it was done very successfully. There were other attempts of students which were less successful.

Right at the moment we have a tiger by the tail. Eight of my students, under Wisconsin Statutes 200, filed for a regular hearing with the Department of Natural Resources, on a question of nutrient supply and waste. The Department of Natural Resources has granted their petition and I believe we are going to have a very large public regulatory hearing. What I fear is that we will find an angry chemical industry up here trying to avenge themselves for the treatment on the DDT issue. Now, I don't know whether I should advise the students to withdraw or not.

Q. Would you comment about the methods of evaluation in an unstructured course?

A. I would prefer mostly to see students evaluating themselves--that is each other. I saw a great deal of that being done with the student projects, when they began reporting to each other what they had been doing. It was fairly clear to most of them what their fellow students thought of what they had been doing--and in a way, that wasn't too unkind. The ones who had really done something had the enormous pleasure of approval by their fellow students. Coupled with that, I made extensive interviews of individual achievement. Sometimes I told the student, "Look, I don't think things are going quite the way they should. I'd like to tell you how I view it, and see what you think."

When you get to the matter of grades--well, I don't think grades are worth much. They don't tell me anything. I frequently feel very uneasy giving them, because I don't know how to evaluate a lot of things. On the other hand, there is a small number of the students who simply haven't been there--whether or not they were there physically--and I'm quite willing to inform them of that; if the grade is the only way to tell them, than I'll use it.

Q. You spoke of the students' longing for "getting out." I would like to submit that in many cases this is an expression of a desire to get in, whether it be into kindergarten, into high school, or into college. Also I would argue that we do not ruin students; this is one of the wrong ideas a lot of people have at the present time. Because you see the students as being so eager to get out, you think we've ruined them. Maybe it is just that they have attained a goal, and then it is no longer a goal. Maybe they have to take up something else and call that a goal.

A. I think there may be much in what you say. Certainly, we are conditioned by advertising to be discontent with the present. "You are not happy now, but when you buy our product then you'll be happy." Certainly the elementary school student wants to get into high school--school has got to be better than this. And the high school student wants to get into college or graduate school.

I don't necessarily think that education has ruined everybody. I think it is a mistake to sit and flagellate ourselves for how bad things are. After all, everybody in this room survived it, one way or another. And it hasn't, after all, converted us into automatons.

Q. What is the difference between process-oriented and content-oriented?

A. I think that if you begin, even in a mild way, to consider the process you are undergoing, the content just comes raining down on your head. One student, a junior in biology, had really been alienated from reading books. He read only the textbook and only

what he was assigned to read. All of a sudden in this course I told them, "I don't care whether you read anything or not." He must have read fifteen books in the course last semester. A couple of those books, one by Loren Eisele and one by George Gaylord Simpson, certainly taught him more about biology than I was able to teach him. Those books gave him more about biology than I was able to teach him. Those books gave him a personal feeling for what it is all about.

Q. There have been many experiments done which indicate that about 20 percent of the students and perhaps 20 percent of all people prefer to learn this way, while 80 percent don't know what you're talking about.

A. From the very brief description I gave of the curriculum you'll note that it tends to accommodate the fact that people are different and that they don't fit well into one or two or three bins. Some people at the age and personal development at which they find themselves in school, can accommodate one thing, and some people another.

RESOURCES FOR

ENVIRONMENTAL

EDUCATION

ALLOCATING RESOURCES: AN OVERVIEW

Those engaged in environmental education activities are aware of the lack of a research base to aid design of effective environmental educational materials. Currently, our best knowledge comes from environmental education's natural resources dimension. In the broader area of environmental studies, this knowledge can help in designing environmental education materials. Of course, initial judgments of instructional materials must be verified and modified by appropriate future data input.

Existing instructional materials from many disciplines can be useful in forming initial tentative decisions about the nature of environmental education instructional materials. Additional guidelines for materials development can be derived from psychological patterns of child development--for example, the learner's need for concrete environmental experiences before dealing with higher levels of abstraction.

Materials development activity must avoid overemphasizing the technological approach--the efficiency criterion model for preparation of materials. No doubt some research and development activities can produce materials that "guarantee" results. However, is the product obtained so long in development that it is out-dated before ever being available for consumption? This factor must be considered in preparing materials.

Materials should allow the learner to interrelate and interact with his own community. This is an important criterion for designing instructional materials in environmental education. Another useful criterion is that any material that has some use should be used, ideally in the total learning environment of the community.

Environmental education instructional materials must focus on key concepts, such as interaction and interdependence. They should give the learner an opportunity to consider multiple approaches to solving environmental problems. A variety of problems must be included, some with definite solutions while others require invention of solutions. Both open-ended and closed materials could be used.

Sequences for the design and utilization of materials are also needed. At present some postulations about effectiveness of various sequences can be made, but many are still unverified. There are, however, certain principles for designing instructional materials that are accepted by environmental educators. For example, materials should be interdisciplinary in nature and present more than basic facts and information about problems--they must consider man's role in creating the problems. While more natural resource aspects are currently being included in environmental education materials, the other dimensions of economics and political processes must not be overlooked. Development of units, courses, and curriculum guides are useful in the initial stages of materials development, but this is not environmental education's long range goal. Materials can make people more sensitive to the nature of problems, but both producers and consumers of materials must seek new means to approach problems if environmental

education materials are to be best utilized. Appropriate materials for environmental education deal with questions such as "What kind of life do I want?", and "What kind of environment can we have?" The resolution and study of these and related questions are the basic environmental education arena.

Effective environmental education materials help the consumer learn to set priorities. They confront him with the necessity of making choices in his interactions with the environment. They demonstrate that alternatives are available and that the past is useful in helping to reconcile decisions. The best materials urge commitment to alleviating environmental problems rather than mere voicing of knowledge or concern. They provide opportunities for teachers and students to cooperate in analyzing, studying, and resolving environmental education problems. Good material emphasizes involvement over information, causes over symptoms, focuses on activity rather than prescriptions for activity, and develops local problem approaches which may be applied to broader concerns. Such material establishes bridges between the educational and the total community.

Model generation is an important approach in developing materials. Such models tell the learner that the search for solutions to environmental problems is never ending. A positive approach to problem solving is based on the assumption that problems can be alleviated or controlled. However, the user recognizes that change and results often come slowly, and sees the necessity for patience and concentrating on producing change in people's orientation to the environment. Human ecology is stressed together with a recognition that acquiring ecological knowledge is a means not an end.

As far as facilities for environmental education, those who ask "How do we develop facilities?" may have missed the point. There are an enormous, possibly an infinite number of environmental education resources available. It is more appropriate to consider environmental education facilities in a theoretical framework rather than as physical places. If the theoretical framework is sound, the physical sites or facilities will come naturally. The concern should be to develop a way of thinking.

ENVIRONMENTAL MANAGEMENT EDUCATION--A NEW LOOK

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Robert Roth analyzes existing environmental education materials and also comments on the design of instructional materials from a theoretical viewpoint. He indicates that existing materials concentrate on factual knowledge and are designed for teachers. The materials surveyed generally lack interdisciplinary approaches, techniques for evaluation and consideration of human ecology. Implicit in Roth's remarks is that development of tangible materials may be overemphasized. Development of a philosophy for utilizing existing resources teamed with development of a few "prototypic" materials may be more important.

"Environmental Management Education--A New Look", is another attempt to: (1) define the scope of environmental education; (2) examine the array of existing literature to discover materials for teachers and students that are appropriate for environmental education; and (3) indicate some of the gaps and areas of concern needing further research and development.

In 1960 while I was teaching in New York City, we were confronted with the task of developing some environmental materials that would be appropriate for children in the inner city. It was a frustrating process. I was armed with a master's degree in conservation education that highlighted practices like contour plowing, strip cropping, and forestry. After looking through files of charts, I found some beautiful red tractors, flat fields, and contoured hills, but the students sat there thinking, "Yeah, so what!" It was completely out of context for inner city children. It became apparent that attention had to be given to ways of viewing the environment; and the ways these children viewed the environment is different from the way you and I might have viewed it--a fact which becomes obvious when we looked at our backgrounds. We found, in over 500 students in the School of Natural Resources at Ohio State, that virtually 90 percent of them have some kind of an agrarian background. When we start talking to other professors in schools of natural resources, conducting environmental education programs, we found that most of their students had a liberal exposure to some kind of agrarian existence, either directly or indirectly also. Many of our students came in wanting the program because they liked to hunt and fish. It is therefore no great wonder that we're having difficulty manufacturing new kinds of

activities that are necessary for transmitting understandings to an urban-oriented population.

Earlier we heard some definitions designed to clarify the difference between science and technology, that were loaded with values. Before going too far into this talk, I'd like to share my bias also. Science is primarily a knowledge-generating activity while technology is a knowledge-using activity. Technology is neither good nor bad. We have heard that we should "slow technology down"; I don't quite agree. It's a matter of how priorities are assigned. As a process, as a technique, and as a management tool, we need technology. A definition of environmental management education that will be developed a little bit later will use management and technology to a great extent. In fact, if we're going to manipulate the environment for any purpose, technology will be the tool employed.

A question used with students quite often is: "What kind of an environment do you want?" The responses can then be related to a much larger kind of question such as: "If you could have the best kind of life you could think about, how would you like it to be?" You can probably write a long time on this topic--or not at all, as the case may be. In our own student populations where we've used this technique, the first reaction usually is: "What's this got to do with conservation?" As some of the things they've said are developed and relationships drawn, the relationship with environmental management practices became clear. Such questions are useful to stimulate thinking about various issues. The way the student views the environment determines how he will answer that kind of question. When the students pass the need to simply satisfy the teacher, and are finally convinced that you don't really want anything other than what they want to talk about, then you can start getting down to some of the real environmental issues.

It is possible to move from the question of "what kind of life do you want" to "What kind of an environment do you want". A number of considerations thereby arise in looking at the environment. First, what kind of resources are necessary for survival? Second, what kind of resources do we need for our level of affluence? Is our affluence level a realistic goal? Third, what are the management alternatives? This last question seems to be one of the really crucial aspects in any environmental education program. If you're going to talk about what constitutes an optimum life for you, then you must have a variety of different ways to achieve it, because there is no single unique way.

As Peanuts says: "Our generation has been given the works--all the world's problems are being shoved at us". "What do you think we should do?" "Obviously, we stick the next generation." This has been our past history, and these are some of the things at which our students are rebelling. They tell us, "We don't want your problems". However, they too will be passing on problems to the next generation. They may solve some of the problems that we've created, but in the process they will create some of their own. One of the key issues involved in

environmental conservation is keeping options open for future generations. That's a very difficult assignment.

The kind of environmental education definition that has been found useful follows: Environmental management education is the process of developing a citizenry that is (1) knowledgeable of the interrelated biophysical and socio-cultural environment of which man is a part; (2) aware of the associated environmental problems and management alternatives of use in solving those problems; and (3) motivated to work toward the maintenance and further development of diverse environments that are optimum for living. The concept of optimality is an essential component of this definition and has been worked out quite well here on the Madison campus by Van R. Potter in cancer reasearch. He's written a new book entitled Bioethics, which you might find enjoyable and also quite stimulating reading. He realizes we all exist in a fluctuating state--what's optimum for one person may not be optimum for another--but within his context it would seem there might be some ways of reaching approximate consensus on environmental optimality.

Clustered around a central environmental problem are a number of approaches to problem solution. These have been arbitrarily grouped into four basic categories. One category deals with Change and Dynamics; within this are the adaptation type of concepts that are extremely important for students to know. A second category deals with the Socio-cultural Environment, and which contains a continuum of things such as aesthetics, politics, family and economics. The third category deals with the Biophysical Environment; within this category is found basic science concepts including physical science, biological and ecological concepts. A fourth category deals with Environmental Management which are management techniques--the decision-making process which could include systems analysis, and cybernetics, one end of the continuum with simpler procedures at the other. All kinds of management strategies are appropriate for modifying the problems with which we're dealing. Each piece of the model would seem to be interacting with each other piece, and at the same time all of them are interdependent. So the problem is central and surrounding it we have a continuum of concepts dealing with Change and Dynamics, the Socio-cultural Environment, and Biophysical Environment, and the Managerial frame.

How can this model be used for purposes of education? Suppose an environmental problem exists in your community. The problem is perceived through a filter and within the context of the change and dynamics of the situation. Already the problem has begun to be modified by your changing perception of it. The next step then would be to move to the socio-cultural realm and apply all of the known concepts that you think are appropriate to the problem. Again look at the problem, and it will have probably been modified in some way. Next the biophysical realm can be explored. The appropriate concepts

from biology, chemistry, physics, and ecology can be applied. Again you can look back at the problem and find that it will have modified even further. The same thing should be done for management. During the course of an entire year you could have worked out concepts appropriate from each of these areas and brought them to bear on a particular problem. Over a period of time you will have modified the problem--maybe not solved it--but you will know more about it now than you did when you started.

This is the kind of model that has been evolved. The teachers that have worked with it seemed to like it because finally they could visualize various processes and concepts interacting to produce a framework for environmental management education.

Existing Environmental Education Materials

A request was received from the U. S. Office of Education to do an analysis of existing Title III and non-Title III materials, in order to identify those items and existing materials that would be of use in environmental education programs. Materials that were already developed and in print that could be used as models for further environmental education curriculum development were being sought. Building on the kind of definition outlined previously an analysis project through the ERIC Center was initiated to try to identify useful curriculum guides. The first problem encountered was the fact that no one in U.S.O.E. or any place else seemed to know where all of the Title III projects were located. Various offices of U.S.O.E. were querried and a rather elaborate questionnaire campaign across the country was developed that sent out some 2700 questionnaires to various projects.

Thus far 185 different centers have been identified that have had or are operating Title III projects. This total does not include many of the smaller Title III projects within a given state. Of these 185 centers, 112 had sent in material of various kinds, and 39 centers had materials that were deemed to be good enough for detailed analysis. Criteria for the selection of these materials was developed and 472 documents were evaluated. About 343 documents were eliminated as not being curriculum material--for example, project descriptions, information lists, lists of marine organisms. A detailed analysis of 129 specific items was completed. Of these, 118 were teacher documents. Teacher documents often contained a number of sheets or guides that could be placed in the hands of students, but only 11 documents existed that could be called student material. The teacher documents constituted the bulk of that which was examined.

The goal was to discover those materials which would be of use in environmental education. In a sense, that was unfair to many of the projects examined becuase Title III was originally developed to innovate outdoor education programs. Now we were applying a different kind of criteria for selection than that which had originally been intended. In fairness this fact must be emphasized. When stating that

this was not a good project or that was a good document, you have to remember that that project or document was not designed to meet the criteria that were now being applied.

A number of kinds of instruments were developed to evaluate documents that included the following areas: grade level, media, format, target population, appearance, the type of participation, whether or not evaluation was being conducted, and the types of content within each of the documents. Content areas included such things as: population, pollution, resources, government, urban environement, economics, culture, sensory, involvement, recreation, family, values, and health.

We had panels of twenty-five experts from various parts of the country evaluating documents. We developed teams of three people each, and each person read all of the documents that were assigned to a given team. After they had finished reading these, and after each had filled out a completed instrument, they had to develop a fourth completed instrument, which really summarized the feelings of all three; if they had some divergence of opinion, they had to negotiate until they reached a consensus. Once the consensus was reached, the documents were passed on to a second team. So all of the 129 materials were passed through two teams of these experts for purposes of analysis--it was a rather fine-tooth comb.

An attempt was made to construct a panel of experts in a way that would include the major concerns involved in environmental education--we wanted these people to wear as many different hats as possible. We had representatives from the Conservation Education Association, the AHPER groups, the Outdoor Education Association, and so on; we went through a number of professional groups, like the social science groups, on to the National Science Teachers Association. Next, a cross section of secondary, elementary, and college, and also from the rural through the urban environment was sought. The teams have worked together three different times so far, and a number of members have come in on their own independently to finish up some of the tasks. There was quite an involvement of time and energy on this project.

Gaps and Needed Research

After an initial review of the completed work, there are a number of things that can be said. Most materials examined were teacher documents and there was little material to place in the hands of children. Secondly, three times as much material was targeted for grade levels 4 to 6 and 7 to 9 than for any other grade levels. Little existed at either end of the educational spectrum. Much of the material dealt with a resident experience at the sixth-grade level. There certainly was not a good K to 12 distribution that we think is important for a good environmental education program.

Most materials lacked the sequence of experience and were simply isolated activities drawn together. This was an important factor, and

something that ought to be considered in future proposal development. Interdisciplinary approaches were often mentioned but little effort was expended in suggesting ways that these interdisciplinary approaches could be achieved. Most documents used the word "interdisciplinary" but there was no clear direction as to how it could be achieved. Most of the documents were factually accurate. An interesting point might be that teachers like facts, and can teach isolated facts by the bushel and feel very secure and safe. The majority of documents called for some kind of active participation by the learner, but most would be construed to be in the lower cognitive realm--a lot of observing and listening and a little bit of discussing--but not too much about hypothesizing and applying some of the concepts that were learned.

Almost no evaluation had been attempted--in fact, it was seldom mentioned in any of the documents. The emphasis on management overall was very weak. For example, resource categories consisting of soil, water, plants, animals, air, minerals, and so on, were mostly descriptive--describing the characteristics of a resource, without very much emphasis on management. Another interesting category was population--including human, plant, and animal--but most of the material dealt with plant and animal. Very little use was made of the human animal, for purposes of teaching. Pollution was emphasized quite often, but it was primarily descriptive, and again had little emphasis on management. In the government category, citizen involvement was emphasized quite often, but it usually surrounded such activities as writing to your Congressman and being informed. Some other alternatives are clearly needed in that category.

Economics seemed to be an increasingly important item. Culture was considered a number of times, particularly from a descriptive standpoint. Sensory involvement was emphasized to increase the education of the children using a multi-sensory approach. Recreation was not very prevalent in most of the documents. Even in resident program descriptions there was not much emphasis on recreation. Emphasis on family life and family planning was extremely low. As one might expect, ecology was emphasized in a number of the documents, but very little emphasis was placed on human ecology. Health and safety, interestingly enough, particularly in the public health realm, was almost nonexistent; the people from AHPER were quite distressed at that fact; they'd like to see a lot more of it. The general conclusion was that most of the materials did not deal with environmental education.

A number of recommendations could be made after looking at this material and digesting it a bit. One certainly is that a greater emphasis for environmental education is needed, so that the materials will reflect the various aspects of urban life, man, the socio-cultural domain, and energy.

Interestingly enough, minerals and energy were almost nonexistent in the resource categories. Very little attention was paid to that, and now we're in an energy crisis--if we can believe the newspapers.

Production of materials and dissemination of them was not one of the thrusts of most of the Title III projects; therefore materials were difficult to obtain. Evaluation, both process and summative, is essential and there ought to be some evaluation by the teachers of the problems they've encountered in using the materials. That generally was not considered.

I would like to share with you some of the things that have been identified as the best documents in Title III:

1. A program developed by Dean Bennett in Yarmouth, Maine. The regional environmental education program in Yarmouth is considered to be one of the best in the opinion of our panel of experts.
2. A second is the Water Quality Monitoring Manual, from Browns Mills, New Jersey. Gene Vivian has been instrumental in developing this particular one, along with Fred Mason and Joe Howdark.
3. The Dune Detective of Arterett County, North California. They used ecological studies to reconstruct events that shaped a barrier island.
4. A group of documents which rated fairly well were those of the Golden Valley Project. Most were very good. This set has now been reproduced by the National Wildlife Federation and is available from them.
5. The Rose Tree Media School District, in Lima, Pennsylvania --the Southeastern Pennsylvania Outdoor Education Center produced a document containing a number of excellent activites.

Non-Title III materials are also being analyzed. We're now dealing with 900 different documents in the non-Title III category. This analysis is still in process, but already there are three documents that have been rated excellent. One of them is entitled Population; this is by SCIS. It's a teacher's guide, containing many activities and experiments dealing with population--plant, animal, and human. A second one is entitled Man Against His Environment; it's a television series presented by the State University of New York at Albany. The third one is Our Man-Made Environment, produced by the Group for Environmental Education, in Philadelphia. This document has been tried with slow learners in Lancaster, Ohio, and in a graduate class at Ohio State with excellent results in both instances.

Another project being conducted by ERIC/SMEAC is finishing up a research review in environmental education. Eighty-seven different research articles that deal with some aspect of environmental education are included. The report will be distributed through the U.S.O.E. If you are not on our mailing list for the ERIC newsletter, just drop us a note and we'll make sure that you get placed on the list. It's free of charge. Nine newsletters come out each year; new products that are available through the Center are announced in each issue. Several other projects will be announced as they are completed.

Summary

As can be noted by the preceeding comments, the time has come for each of you to become actively involved in defining, structuring, and implementing sound approaches for environmental management education. An adequate definition exists, an increasing array of materials are available, and there is ample opportunity to devise effective research strategies for determining effectiveness of various programs and materials. Take another "look" ... and commit!

ALTERNATIVES FOR DEMONSTRATING THAT MOTHER EARTH IS A "CROCOGATOR"

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Environmental education "facilities" should reflect sociological as well as ecological considerations, according to Michael Naylon. He indicates we might better refer to resources rather than facilities for implementing and facilitating environmental education programs. Resources allows us to consider both horizontal and vertical space, including the time dimension when examining program development resources.

The resources for environmental education programs include all of man's surroundings. Any part of an individual's surroundings which permit him to contact reality are his resources to acquire an environmental education--especially when these resources indicate more than just the mechanical reality of existence. Resources provide a hands-on experience at the interface with the culture where the individual eats, sleeps, works, laughs, and loves. Any situation which provides such a study option is appropriate for environmental education. Anything which offers an opportunity to consider how well living things fit into both natural and man-made habitats, the sources of obtaining energy to keep the systems going, and the interrelationships in natural and cultural communities that hold and support its members' social and biological needs--all these are valid environmental education resources.

Introduction

This paper was to focus upon facilities, current and anticipated, necessary to the implementation of environmental education programs. Tooling up for this session, however, proved to be a frustrating, academic exercise. It resolved only the following items:

1. An educational program, emphasizing environment, is a refreshing but complex process that purports to facilitate the acquisition of a functional awareness, appreciation, and understanding of the mechanics of our surroundings.

2. Whatever this process is, it may or may not result in an "empathy ethic" that may or may not have a high survival value for man.

3. To be of functional worth, environmental education programs should probably use an integrative systems approach to learning.

4. An educational system of this type has scheduling and accountability implications that give administrators and hard-core single disciplinarians of the genus Non-flexilous bad dreams.

5. In lieu of a singular discussion of physical facilities, it would probably be time better spent if we addressed ourselves to a consideration of resources and a concomitant examination of the rationale for their need.

In an attempt to sort out the obvious, it became apparent that any environmental model of the learning domain had to have the dimensions of vertical space, horizontal space, and time. The concept of vertico-horizontal considerations is reasonably consistent with the standard transect techniques of ecologists. Inclusion of "time" as an environmental variable is obvious to those of us who never seem to have enough of that particular commodity. To further develop the model, it was necessary also to assume that the anti-entrophy-like ordering of data bits accumulated in a fashion that:

1. contributed to some growing body of knowledge and helped to better define "reality" in terms of an event probability model;

2. negative knowledge and intellectual dead-ends were eventually eliminated, corrected, or left behind on the "t" line because they were unimportant to the total knowledge model (Illustration 1).

The end result of all this pondering was the enclosed super-simplistic, hyper-symmetrical-to-a-fault model. It hasn't resolved a single significant educational or philosophic dilemma, but it brought me to a point where the following issues had to be raised:

1. The "knowledge" model is decorative at best and functional only if you wish to limit the intellectuality of your program to a Newtonian-like consideration of mechanical reality.

2. As long as Man seems to be an ecologic prime-mover, can a problem-solving approach, using the scientific method to explore such a shallow model, accommodate something as non-predictable as man, or as ill-defined as his invented hyper-evolving culture?

ENVIRONMENTAL DIMENSIONS
AND THEIR RELATIONSHIP TO INQUIRY

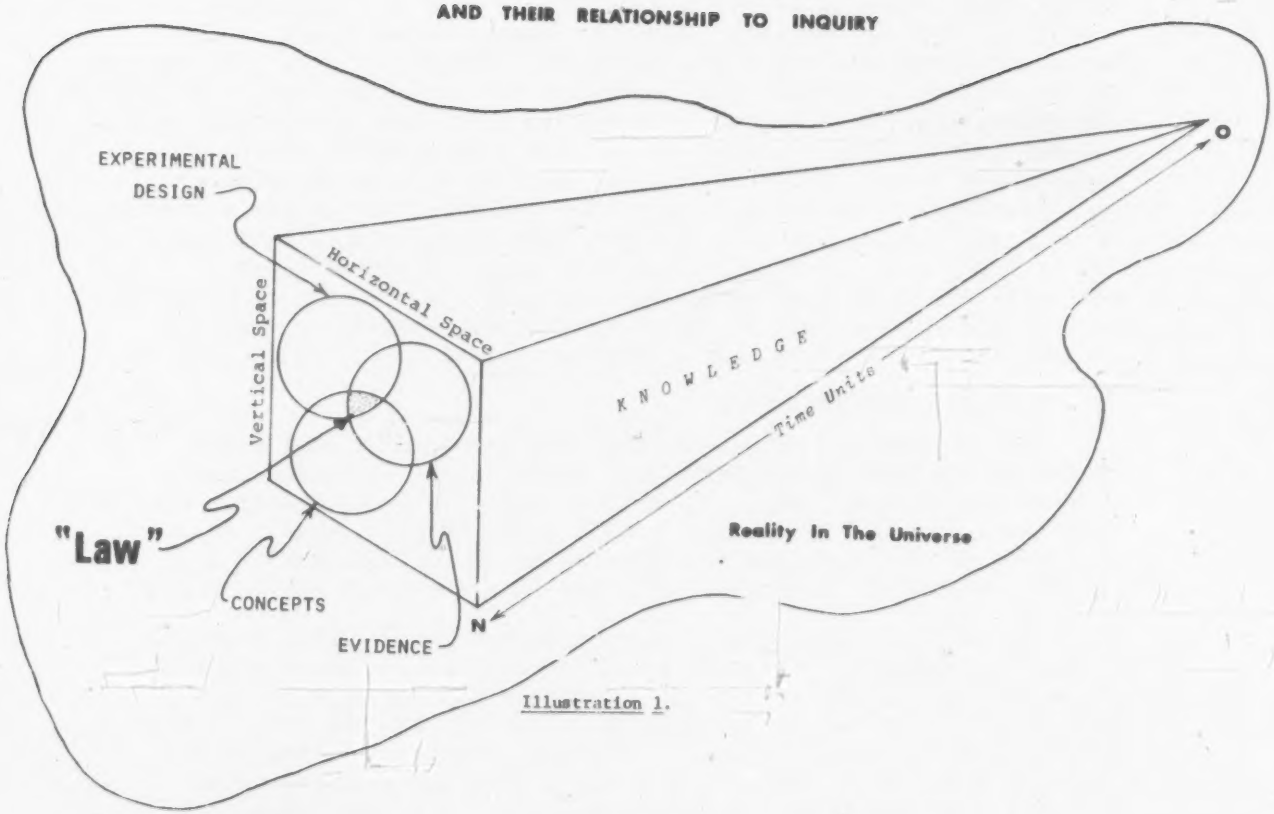


Illustration 1.

A review of the accompanying schematic shows the scientific method to be a process whose output is also essentially a model (Illustration 2). It is common knowledge, however, that the formulation of workable models is contingent upon successfully accommodating significant variables. Environmental education raises the uncomfortable question of optimum numbers of socio-ecologic variables that might be accommodated in any system or sub-system that is being studied. Question: Is it feasible to assume that we can realistically contemplate an eco-system whose ecologic inputs and outputs interface with, react to, and are dependent upon an artificial sociologic construct?

Further, current environmental issues suggest that the cultural artifacts contributing toward the evolution of an environment hostile to the continued survival of man can be eliminated by either cancelling Man or modifying the output of his cultural artifacts. Should we, as a race, choose not to opt for self-deletion as a species, then we better fish or cut bait and education seems to be an attractive option for effecting some of the necessary changes.

In the past four years I have become convinced that Man's greatest intellectual drawback is the super-delusion of a self-contained recycling, life-rejuvenating, haven-in-space, Mother Earth. Most of our own project's piecemeal educational efforts at this time testify to our ecologic naivete. They exemplify our sociologic incompetence and immortalize our failures in curricular software, whose main intent was to pluck at single strands of the eco-system web in purely a noncultural sense. It is only after four years of frustration and a "lay-a-mistake-away-a-day" effort in Minnesota that we see a promise of at least partial success. We have come to the realization that Mother Earth is a "Crocogator" and that learners can at least partially verify this generalization by actively engaging in a hands-on exploration of that part of the biosphere that interfaces with the cultural construct within which they eat, sleep, work, laugh, and love.

Rationale for Re-orientation

My children recently came home with a record by Bill Cosby. In one of the monologues, Cosby is reconstructing a conversation between the Lord and Noah. After establishing his credentials, the Lord says, "Noah, build an arc." Noah says, "Right. What's an arc?" I suspect at this time you find yourselves in the position of Noah. "Right. What's a 'Crocogator?'" "What's a 'hands-on ray of hope?'"

First, let's discuss why I am calling a four billion year-old lady a "Crocogator." There is an off-colored parlor story about the meanest animal in the world. It reportedly has the head of an alligator on one end and the head of a crocodile on the other. This situation poses a rather serious elimination problem to the beast, and what makes it so mean. Mother Earth also has an elimination problem. She throws very little into space. Her "metabolism" is geared to a continuing transmutation and turn-over of the basic energy and material fabric of her being. Some of these turnover products produce subsets of conditions that permit the existence of life as we

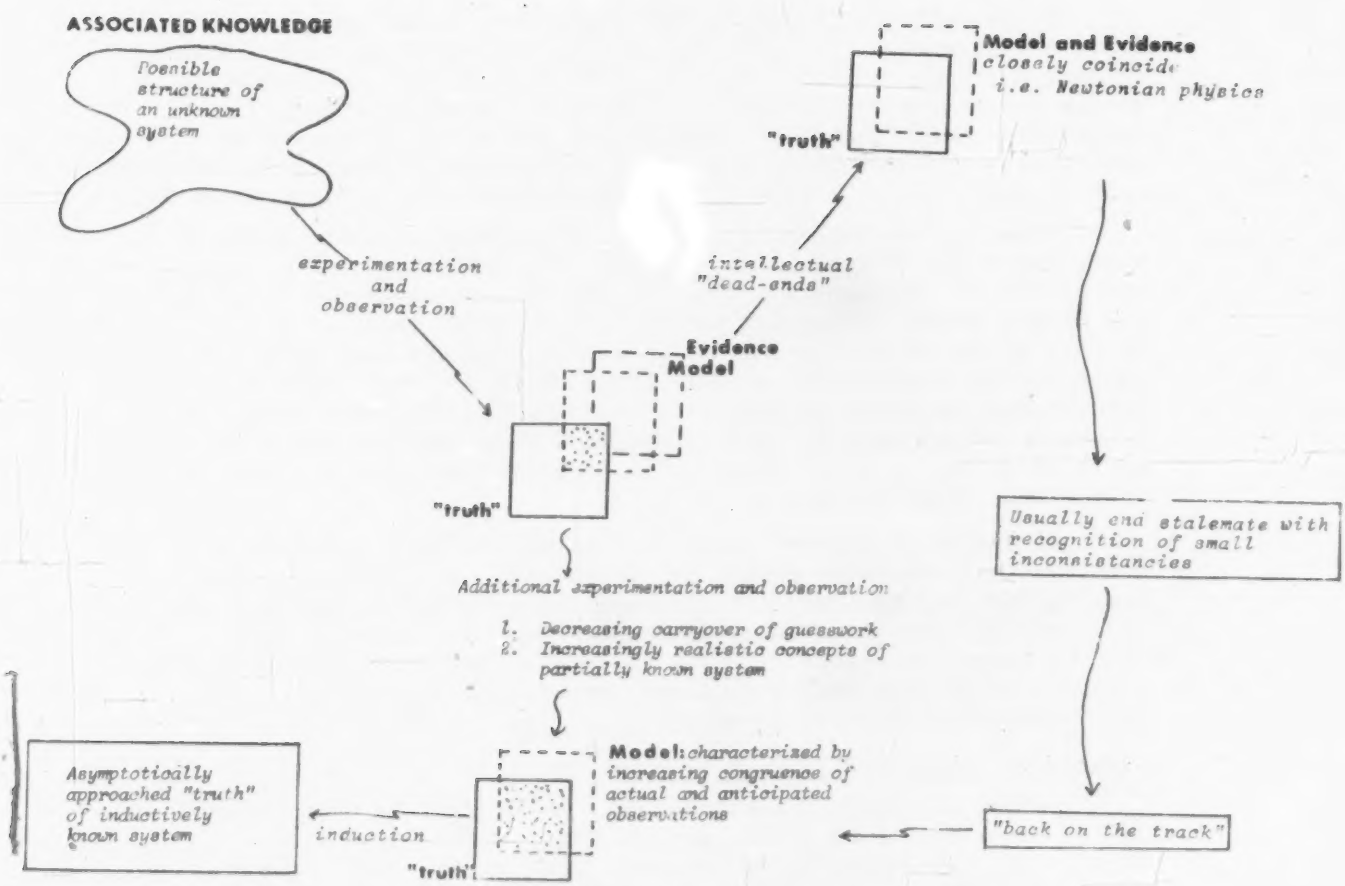

ASSOCIATED KNOWLEDGE
Possible structure of an unknown system
experimentation and observation
intellectual "dead-ends"
"truth"
Model and Evidence closely coincide i.e. Newtonian physics
Evidence
Model
"truth"
Usually end stalemate with recognition of small inconsistancies
Additional experimentation and observation
1. Decreasing carryover of guesswork
2. Increasingly realistic concepts of partially known system
Model: characterized by increasing congruence of actual and anticipated observations
"truth"
induction
Asymptotically approached "truth" of inductively known system
"back on the track"

Illustration 2.

know it. They do not guarantee that there will be life.

Man, in pursuit of satisfying his real biologic and invented cultural needs, is creating cultural artifacts that tend to effect conditional shifts in the biosphere. Urbanites will attest to the fact that these qualitative changes are not in the best interest of the continued well-being of Man. This suggests that we address ourselves to the task of helping our "Crocogator" eliminate. To do this, we are going to have to be on more intimate terms with the beast. Getting intimate means getting involved and getting involved is the way to implement a functional program of environmental education.

It is difficult to argue that experience is not an especially important ingredient in selecting alternative solutions to problems. Because environmental problems are multi-disciplinary in nature, no single discipline can adequately provide its students with an integrative understanding of them. This may be why there are no well-developed theoretical models for calculating a least socio-ecologic cost to guide the selection of land use alternatives (Illustration 3).

Existing environmental problems do not have as their singular cause the greed of a few men. Even at this late stage in the crisis our population problems are probably not as serious as the total mass and energy needed to support our western cultural level of living. In view of our present technologies and desired standard of living, waste and pollution will probably always be a problem. They can be ameliorated, however, by producing fewer goods, different mixes of goods, recycling more of what is produced, and changing the form of waste or manner of its disposal. It is a straight-forward function of rational decision-making.

As indicated in the schematic, perhaps one main function of environmental education should be to provide for a knowledgeable populus that can evaluate alternatives and subsequently demand life-style change through rational programs. Implementation of these kinds of change will also involve the development of new technologies, a change in working skills required, and a whole new category of environmentally-related careers.

Examples of Potential Program Alternatives

Before discussing resources, perhaps it would be appropriate to lay out a few basic goals and objectives for a few of many alternative approaches to environmental education. The following ideas are primarily based upon several Foundation projects that are in their very early beginnings (Illustration 4). In the schematic above, we have identified several planes: the physical environment, the social environment, and a social resultant. Communities are represented as functioning constructs that are the results of cultural utilization of land, space, and resources as modified by constraints imposed by the physical environment. They in turn affect the relationships within the physical environment and a cyclic interaction is established.

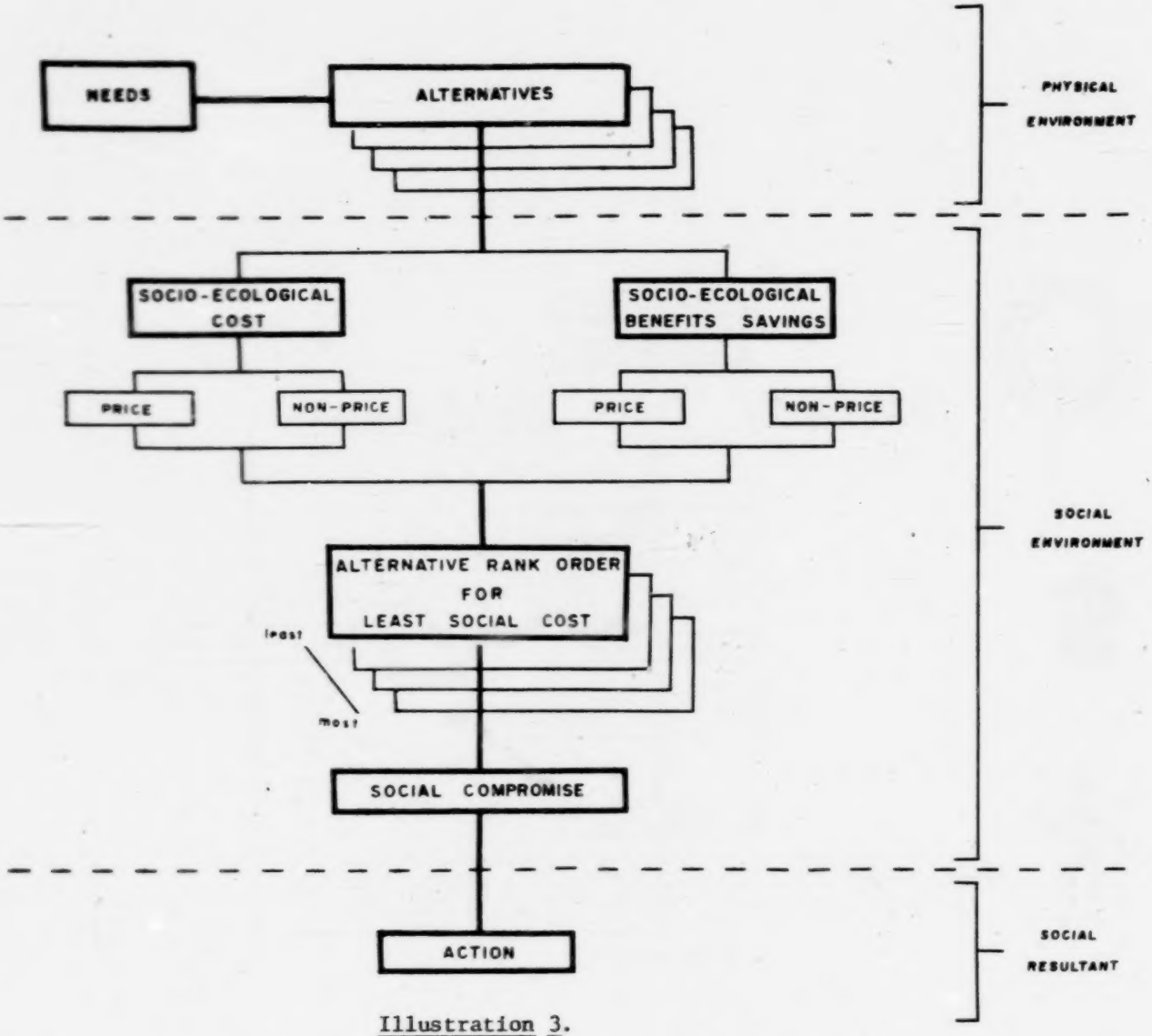


Illustration 3.

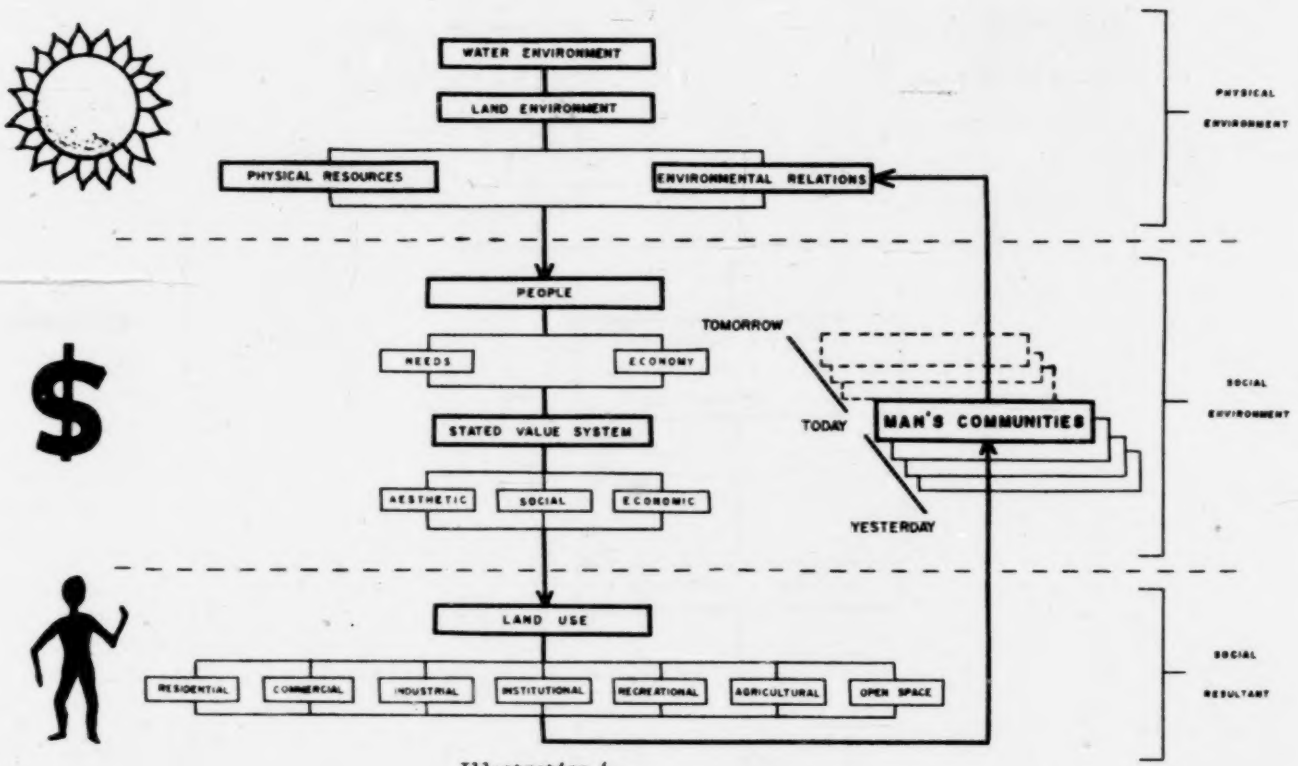
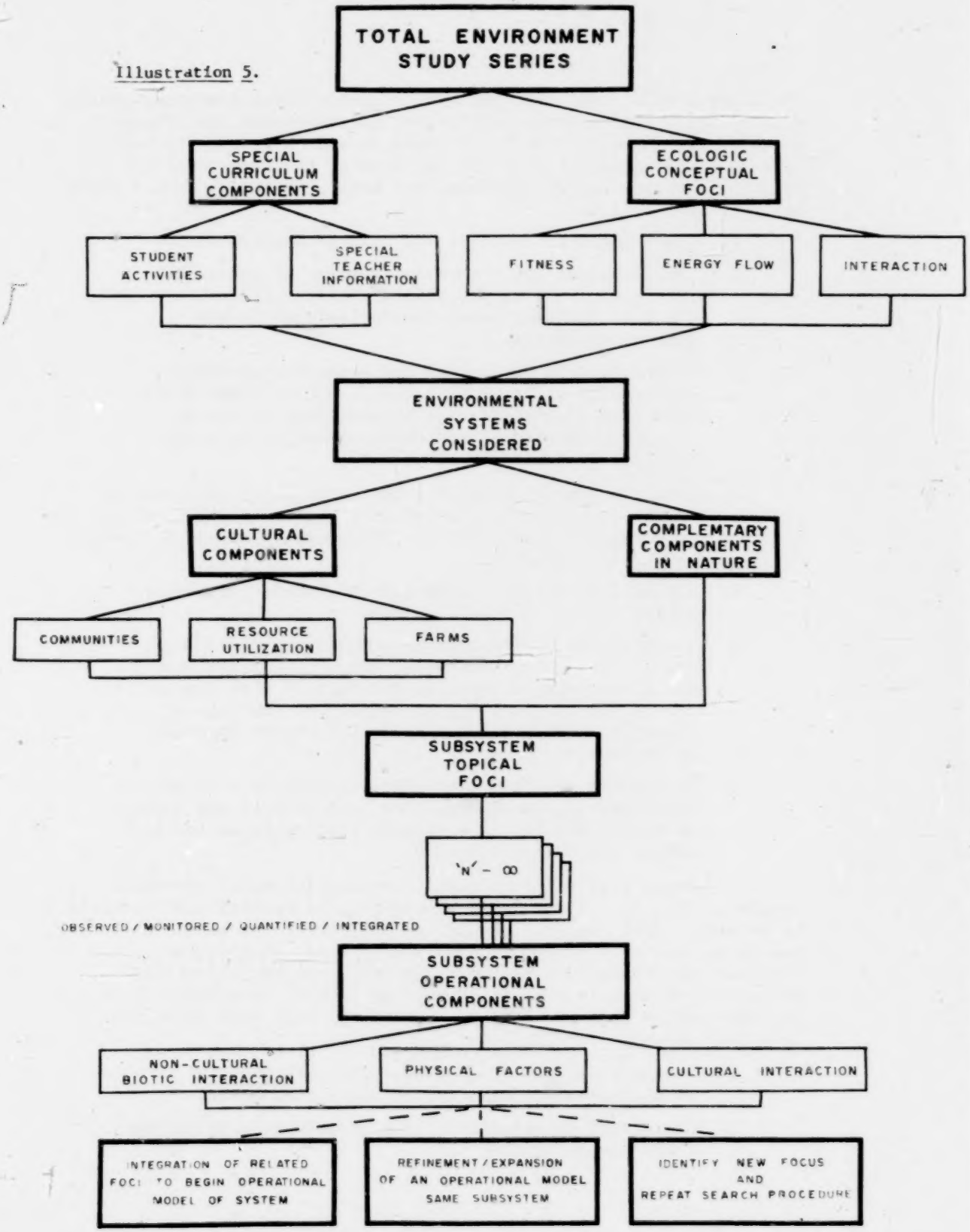


Illustration 4.

Illustration 5.



Using this model the following organizational components might well be built into learning activities (Illustration 5). Though by no means is the model perfect, it does provide a reasonable bridge between learning experiences and facilitates the formulation of a functional background of knowledge and skills by the student. Study options might well be:

1. Comparisons of cultural and natural environments.
2. The functions and interrelationships of communities, both social and naturalistic; utility-utilization; and agro-business/urban interrelationships and interdependencies.
3. Interaction in the social and natural communities, examination of physical factors, non-cultural biotic interactions and cultural interactions within and between communities, and cultural impact upon the physical environment.

A second consideration could potentially begin with another alternative that more closely approximates our traditional orientation to ecology programs (Illustration 6). Learning experiences, however, still emphasize the following:

1. How well do living things fit into their respective biological or cultural habitats?
2. Where do the living organisms obtain their biologic fuel? In a cultural system, where do communities get their energy? What is the role of that energy in the social community as opposed to the role of energy in a naturalistic community of the physical environment?
3. What kinds of interrelationships exist in both natural and cultural communities that tend to hold and support community members in a fashion that provides for both social and biologic needs?

If we can live with the cyclic interaction model presented earlier, there is a strong possibility that activities will eventually be developed that require work in the school, in the social community, and in naturalistic communities of the physical environment. This suggests that environmental education really means "everything" education and that it should probably be taught "everywhere." It further implies that the learner's knowledge will stem primarily from four sources:

1. Observations and experiences with environmental problems in the social context within which they occur.
2. Historical development of the problem as revealed by local documentation.

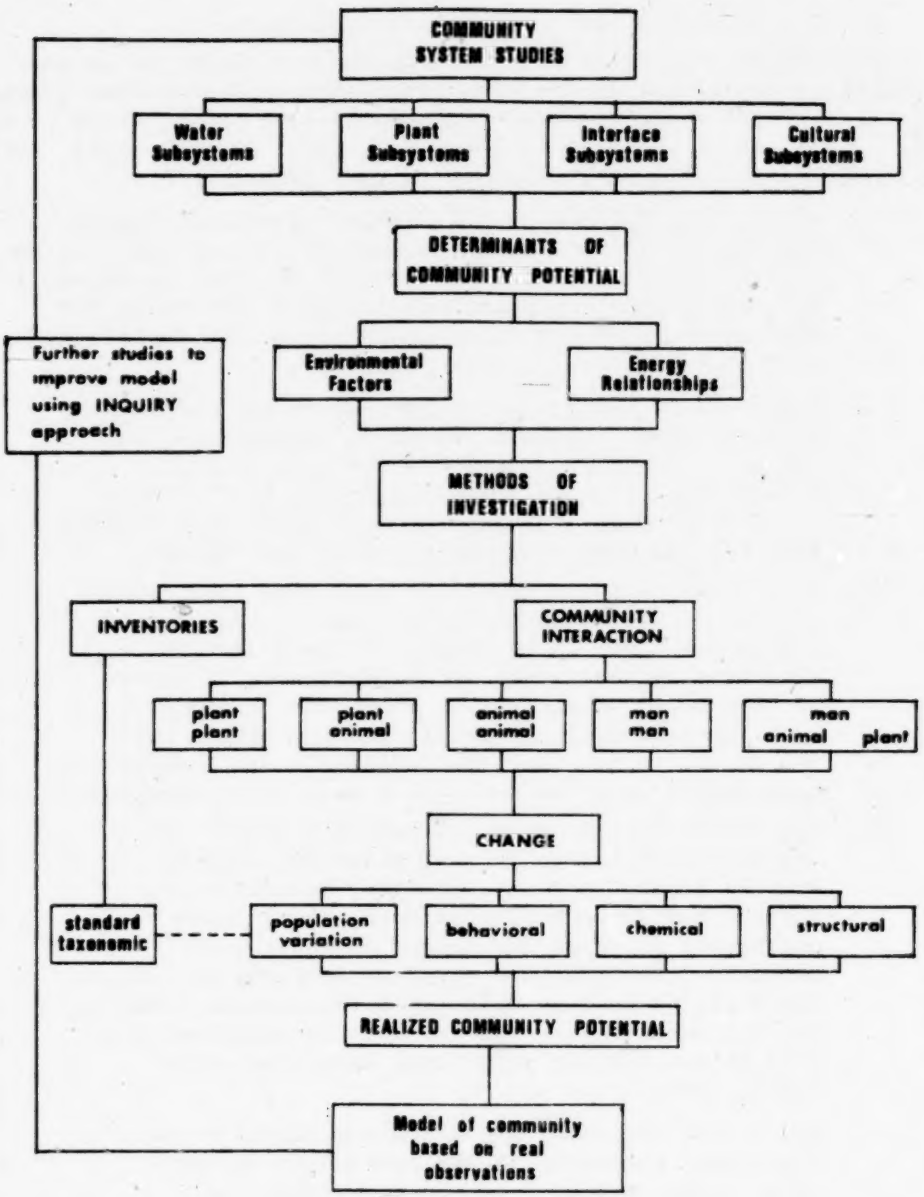


Illustration 6.

3. Exposure to direct experiences and ideas of other community members.

4. The learner's own backlogue of experience.

Members of the teaching profession who get caught up in the business of "everywhere/everything" education will also find themselves working with the following question components in their study units: what, where, when, who how, why, so what, and if...then what? Perhaps we should consider these components in more detail.

1. What - A definition of the problem; devising a means to demonstrate its existence; quantification of the problem when possible; relating the problem to both the physical environment and the social environment; examining to what extent the particular problem required decisions, choices, solutions, and new techniques.

2. Where - A determination of just where the particular problem exists. Does it exist in communities, on farms, or is it found only in the naturalistic communities of the physical environment? Participants would also look for cultural interrelationships that have an impact on the physical environment.

3. When - What are the social or real time implications and how do they relate, for instance, to a community's history, the situation today, or the problematic situation of tomorrow? The significance in terms of time would be determined from both participant data and hypothetical significance projected into the future, using learning information or learner experiences as a basis for this sort of projection.

4. Who - What are the roles of people involved and who is peripheral to the situation but subject to some impact in terms of waste, reduction of quality environmental experience, etc.? Also considered might be the impact on those life forms co-inhabiting the physical environment. For instance, if we dump salts upon the streets, what is the ultimate effect upon the aquatic organisms that live in the holding areas into which the storm sewers empty?

5. How - This component might address itself to the functional mechanics of any particular system under investigation. It would consider the purposes of the system, how it works, and what kinds of assumptions are made as to how it works as opposed to the real facts or information that

participants can obtain. The mechanics of change that occur because of the system's existence should also be considered.

6. Why - Participants might evaluate the needs, rules, and rights of people that are affected by the system and examine the real, suspected or anticipated obsolescence of the function that this particular system serves. In addition to determining why a particular system exists or is operative in the social community, they might also examine the possibility of its functional departure from the purpose for which it was originally intended. Provision might be made for examination of the need for having a particular system, allowing a particular problem to exist, or justifying a system's compatibility with both the social and biologic needs of human and natural communities.

7. So what? - Participants should be encouraged to examine the rules and rights of people involved in the particular study and re-examine some of the assumptions that are made earlier. This kind of approach or introspection may give participants basic experience in the calculation of real, suspected, or anticipated socio-ecologic costs for certain phenomena such as waste problems or supply needs that exist.

8. If, then what? - Participants might formulate and examine the hypothetical possibility of alternative problem solutions. Can a social or natural community do without a particular phenomenon? If not, what are the alternatives? What are the rules and rights of people? What assumptions can be made on the basis of their previous experiences? What are some of the anticipated changes? What is the relatedness of change to other sub-system components in both natural and social communities? During the examination and formulation of alternatives, learners could and should actively participate in the calculation of real, suspected, or anticipated socio-ecologic benefits and savings that would accrue as a result of behavioral or procedural modification of a particular life style.

Everything-Everywhere Facilities

We have reached that point in this discussion where it would be in order to discuss facilities. It should not have taken this

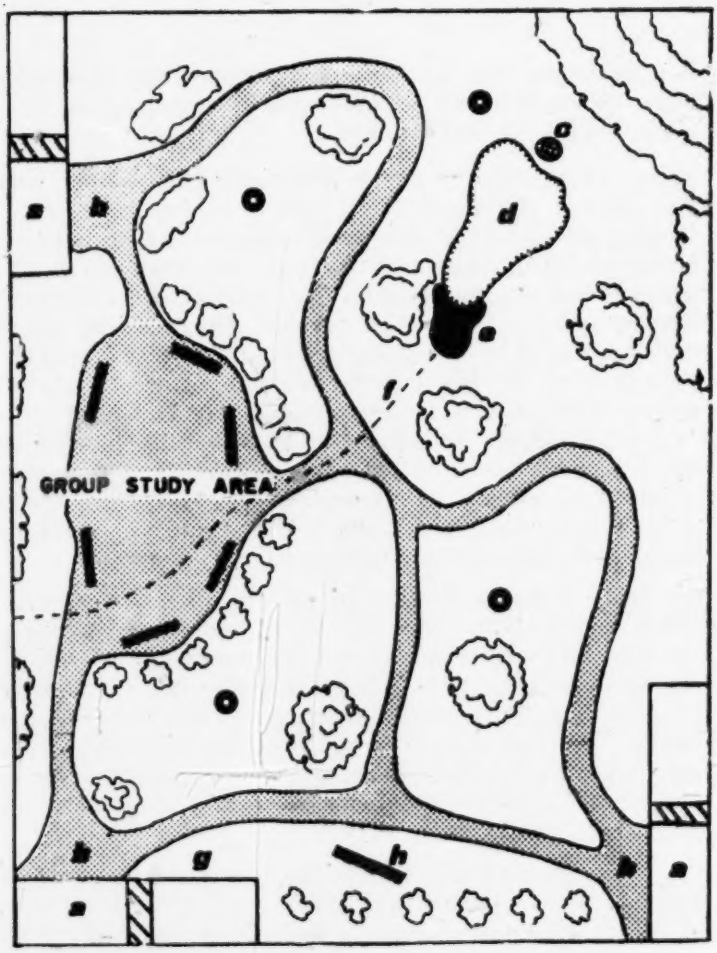


Illustration 7.

long to arrive at the central issue, but I felt it necessary to document the less-than-startling resource list that we have found to be essential to environmental education programs. The "essential" list includes:

1. Motivated teachers, students and citizens who are willing to work with ill-defined, open-ended problems in an attempt to identify alternatives rather than "right" answers.
2. Enlightened administrators who can accommodate "floating" involvement programs in their scheduling and permit their charges to confront real, interacting systems beyond the four walls of the classroom.

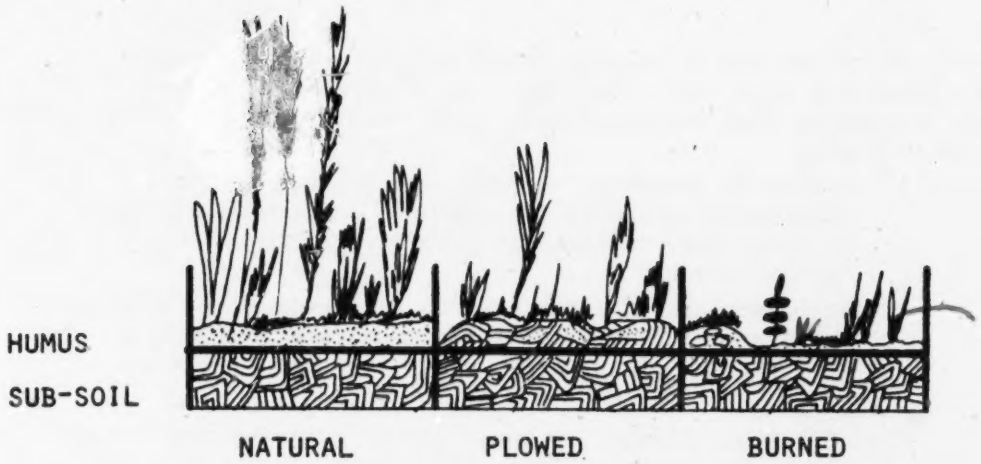
Miss Clark has alluded to the types of programs that we are currently exploring. She has also traced the evolution of our program efforts in an attempt to capitalize upon the resources indicated above. We have found the school site development program to be especially effective in getting teachers, children, administrators and members of the community together in a potentially long-term association that shares mutual vested interests (Illustration 7). In-service programs typically involve teachers in a general orientation to planning and inventory techniques. Their "homework" involves planning and coordinating with children, parents, administrators and the custodial staff. We meddle in homework assignments upon invitation only and usually just to provide "inspiration." During regularly scheduled sessions, we help participants develop goals, formulate time schedules, and determine facilities or models of natural systems that complement the anticipated program (Illustration 8). "Time machines" like the one illustrated do not fit into the classroom. Placed on the school grounds however, they provide an opportunity for children to get their hands dirty while exploring the years as they lie side by side.

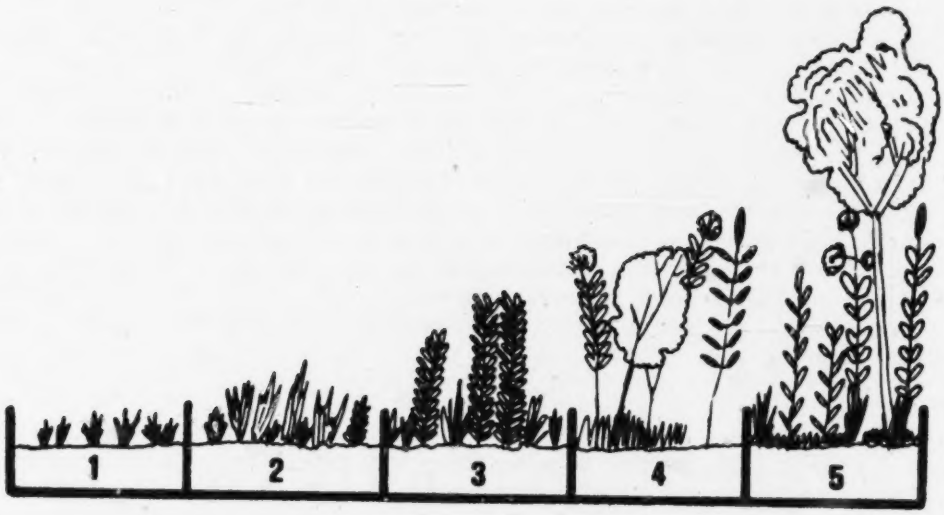
Summary

In summary, I should like to say that our educational system should not isolate the learner from his community. Environmental education programs should attempt to transcend the arbitrary boundaries between local institutions and the community (Illustration 9). Their focus should be the functional, economic community rather than single, clearly defined institutions such as schools.

Environmental educators might begin by considering the following program development goals:

1. Attempt to develop realistic educational search techniques that all schools can use.
2. Examine the impact of culture on the land.
3. Make program participants aware of the problem-solving processes of their society.





ANNUAL ROTATION

1
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Illustration 8.

4. Advocate introspective, rational change.

5. Involve the community in the educational process.

In addition to having a skilled and competent citizenry, society needs "integrators" who can handle socio-ecologic information in their decision-making. There is an urgent need for society to create procedures that will bring about social solutions to environmental problems in an orderly and rational manner. Student and teacher collection and dissemination of data from real, interacting environmental systems within their own communities will (a) promote the development of models that may help to solve some problems at the local level, and (b) expose participants to a wide variety of skills and careers related to the problem area. It has the advantage of using the community's own human resources to do so.

Investigation of environmental problems currently at issue in the community setting provides information of a nature that would contribute in part to local environmental problem-solving and the preparation of future leaders. Participation in these programs might well contribute to the accumulation of a working knowledge of socio-ecological decision-making that: (a) identifies basic types of community leaders observable in situations of community management and/or problem-solving, (b) takes into account the fluctuating nature of society's interest and alignments from issue to issue, and (c) accounts for those situations of community confrontation where consensus and community action are achieved in resolving environmental problems.

Administrative and other school operations will also be affected by the emerging environmental education programs. Adoption of a community study curriculum would have the following implications for the school administration:

1. Regularly scheduled release time for teachers to receive in-service training and/or prepare additional materials generated by student interest will be needed;

2. There will be an increased need for teacher cooperation in those endeavors that are not clearly defined by any single discipline;

3. Current class scheduling may be subject to review to accommodate larger time modules needed for some phases of student fact-finding;

4. Provision will have to be made for increased student involvement outside the school;

5. Focusing learning upon the actual community will bring about an increased public involvement in the educational program. There will be a need to coordinate this involvement and to identify cooperative agencies;

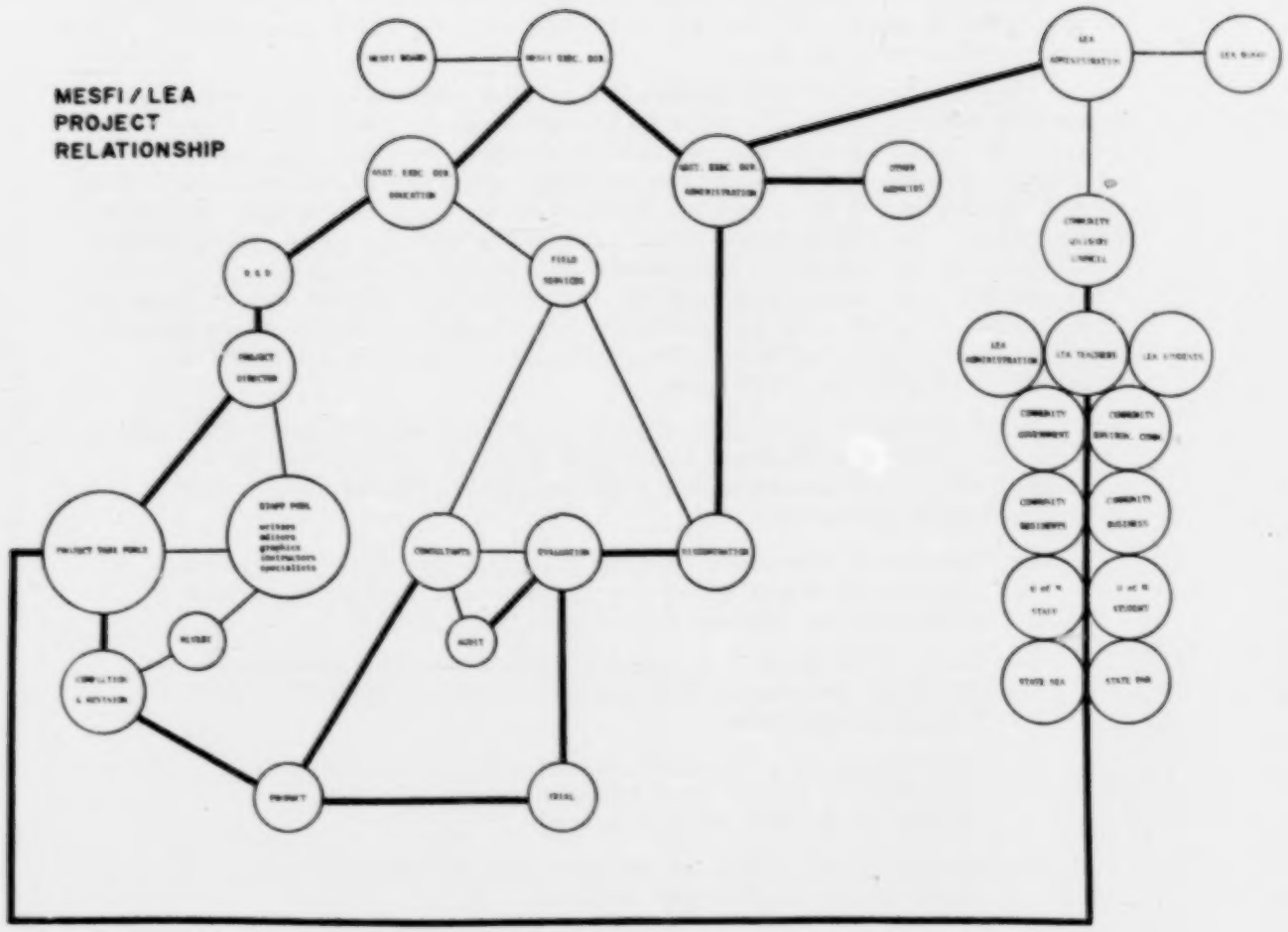

Illustration 9.

6. Operational agreements become more complex due to the number of people and institutions involved. Therefore one needs agreements that involve reciprocities between both selected institutions and representatives of the larger community;
7. Increased public information programs will have to be implemented.

One last point: There is insufficient evidence at present to permit a realistic estimation of the role of leisure in our future urban society. One is prone to agree, however, with the current popular projections of shortened working hours and the release of time for purposes other than making a living. There are some who suggest that an expansion of interest and participation in outdoor or environmentally-related recreational forms will occupy this void provided that our economic system makes this feasible, and the future structure of society is one which makes access to the out-of-doors and one's immediate environs an essential part of the cultural and educational opportunities of our entire population.

I am committed to the belief that participation in realistic environmental education programs can provide for awareness and appreciation of one's environs and, therefore, expedite the resolution of our current environmental problems. I hope that this conference will prepare you for that job. Thank you.

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THE ENVIRONMENTAL SCIENCE CENTER: A CASE STUDY

Barbara Clark
Program Director
Minnesota Environmental Sciences Foundation, Inc.

Barbara Clark gives a first-hand report on the evolution of environmental education activities at the Minnesota Environmental Sciences Foundation. She describes the years of evolving thought that have gone into conceptualizing the existing program. The Foundation's evolving concept of the function of environmental education materials is to help people already engaged in the educational process utilize existing materials. These types of materials would answer the question, "What do I do with kids?" instead of "What do I direct them or give them to do?" This position supports the need for cooperatively developed student-teacher instructional activities.

Examples of facilities utilized at the Environmental Science Center include cemeteries, railroads, dumps, neighborhoods, and street corners. None of these facilities require any additional money or any particular developmental activity. They are available, they are close, they are ready to use. The Minnesota staff has found that typical "conservation sites" constitute only a small fraction of possible sites for environmental education activity.

This talk could have been titled "Coming of Age in Golden Valley." I could have used the Margaret Mead design to explain our origin--our initiation--but that would be a bit presumptuous since the goals and objectives of the Samoans were far more clear-cut than ours have been. We're still very much amorphous--a fact that will emerge as I talk about what's happened at Golden Valley.

This talk could also be titled "The Life and Times of an Emerging Institution." I find the emergence of our institution conforming quite well to the kinds of things written about in The Peter Principle. The emergence of any institution (I really don't like to give it that label--it connotes all sorts of horrible things) is in reality conditioned and accompanied by evolving thought. In our instance we began as a staff of five people, and the institution we have now is pretty much a product of the interaction among those five people and the ones we've picked up and dropped along the way. This personality element has really shaped what it is we've done.

I might say that nothing we have done is really very linear--I will not be able to describe a straight and narrow path that we have followed. There is a lot of noise involved in what we've done, and also a lot of what I would call fits and starts. We were seeking, continually seeking. What I will try to do is depict for you some of the watershed periods in our existence. I may not be able to fully explain why we chose to take the particular tack we did. Michael Naylon has already told you where we are in our thought intellectually and philosophically about environmental education. We're terribly concerned about communities and about the interrelationship and interaction of the components in a community. That is certainly not an end but that's a good point of departure for his remarks.

We began, as Bob Roth noted, as a Title III project in 1967. At that time the Golden Valley school system--our local education agency--was granted funds under Public Law 89-10. The local education agency appointed Dick Myshak to be the director; as such it was Dick's job to gather together staff. (Again, I don't think you can characterize any institution without first looking at the personal elements in it.) Dick chose people primarily who had been involved in the national course-content improvement project, which was sponsored as you recall by the National Science Foundation. Dick was with MINNEMAST and with the University of Illinois; our associate director, Bob Collins, had very good working relations with people at The State Department of Education; Michael was teaching BSCS biology; and Ed Landin was with MINNEMAST also. We had several other staff members at that time--writers and people with skills in audio-visual techniques. But principally, the staff Dick gathered together consisted of people who had been involved in the process of curriculum research and development, and nothing more characterizes, I think, our initial thrust in environmental education than our past experiences with those projects? This will be clear as we discuss our programs and some of our products.

During our first year we had to deal with a proposal. The local agency, Golden Valley, had written the Title III proposal, and within that there were certain mandates. The purposes of the project, initially, were to establish and operate a biological sciences instructional center designed to meet the following educational needs: (1) in-service education for elementary and secondary teachers in content and techniques of teaching the life sciences; (2) comprehensive and coordinated curriculum renewal in the life sciences (this, if you can believe it, after all of the years with BSCS); (3) space, resources and guidance to encourage independent study, experimentation, and research in the life sciences for pupils at all grade levels; (4) coordinated utilization of area resources for enrichment of the biological science program; (5) and, this is critical, increased understanding by pupils of the principles and practices of natural-resource conservation. This last item was the only place in the original proposal where we said that this would be some area of conservation. The first four purposes stated were in areas of the biological sciences where a great deal had already been

done, particularly at the secondary level, and there were projects then going on down in Florida and elsewhere--intermediate level biology programs and this kind of thing. So as you look at the proposal, you think well here we are plowing old ground again. Fortunately, however, the proposal was sufficiently open-ended so that we were able to indulge ourselves in its interpretation.

During the process of putting together our Title III proposal a questionnaire was sent around to metropolitan teachers, asking them to express their needs. Mostly they requested materials and money. The second item we couldn't do much about, however we could design curriculum materials and produce them. This was one of our major thrusts the first year.

Staff experience--that covers a lot of things, both our experience on the NSF projects, our experience in the classroom with kids, a lot of our fishing experiences, and lots of other ways of interfacing with the out-of-doors--gave us some clues as to what we might be doing. Staff experience took another form too. Most of us, I suspect, had been exposed at some time or another to conservation courses, or attempts to teach us proper conservation attitudes. But we knew we weren't happy with our own experiences. We knew that none of us were litterers, and we knew that if we had hilly farms we'd be engaged in contour plowing. We had knowledge of all kinds of conservation technology. But we were very mixed up about the sources of our own attitudes and values concerning the environment. So there was an attempt to examine some of our own personal attitudes and values--to try to see what things happened way back when--in order that we could provide for kids now, through the medium of our products.

We assembled two advisory groups during our first year. These people were, mainly, science curriculum coordinators from Minneapolis and its suburban areas. Unfortunately, these people probably didn't know the questions to ask and we probably didn't provide them the kind of experiences to bring out those questions which would in turn show us what they needed from us. I don't think we ever really were able to communicate with them what we would be trying to do as a group.

Truthfully, we did not know, our first five months, what it was we were going to do in this area of environmental education, because at that point we weren't even talking about environmental education, because of the questionnaire sent out, that teachers needed materials, they needed things to put in their hands, so we began to develop that. First, curriculum guides--not unlike the kinds of things that came out of NSF projects, discrete, self-contained teaching guides with a line of inquiry developed for the teacher, because the teacher usually doesn't know the kinds of questions to ask. We anticipated student responses and built those into the materials. This, I suppose pretty much typifies what we've done in terms of curriculum material production, up until our last year or so.

For our first seven or eight months we were housed in a classroom, and we were sitting practically on top of one another--seven desks or so in this one classroom--and we attempted to work out of that. We were located in the middle school in the Golden Valley school district. Fortunately, on the school grounds there was a pond, which was really a source of inspiration for the Title III project, in its beginning. This pond was a mess, it was being encroached upon by the community, it was not being used by the school personnel, but it was being used by kids as a recreation area. The present superintendent of the school district thought it would be a very fine idea to develop some materials for using the pond to provide experiences for kids and teachers together. (Somebody said that our superintendent is the only person able to make lemonade out of a lemon.) Anyway, that was really how we came into being. There was also a field near the pond, and a creek running nearby, so we had those sorts of "natural" resources to work with.

We had no constituency, we had no clients. The potential clients were very loosely distributed throughout a seven county area. about 250,000 children, I believe, and maybe 25,000 teachers. (I may be wrong about those figures, but they seem close.) So, there we were, five of us against the seven county area, and how on earth could we ever expect to deliver the punch to all the kids, when there were so many of them and so few of us. We decided very early, then, to do what has been done with other curriculum projects--that is, we chose to engage in in-service with teachers.

During this first seven or eight months, we proceeded on intuition and previous experience, and out of whatever falsities were involved in our input, we developed some environmental curriculum materials. We needed some things to support our in-service training program, so we sat down and wrote like mad. And how did we choose the things we wrote? I don't know for sure. We used bio-ecology, basically, as our concept guideline, and we tried to think of those things teachers could do with kids in the classroom that would help them examine some of the major ecological mechanics.

In March, then, of our first year, we put in our first in-service program. We decided that teachers needed at least twenty hours of experience with us to change. Now, when we said change, we were not certain what we really meant, and we're not prescribing any type of behavioral objectives at this point, but teachers would at least be doing something in the classroom different from what they had done before. Our first in-service program was based on the curriculum material we developed, and for the most part we spent two hours on Thursday afternoons going over the kinds of experiences and activities--with details and teaching guides--which the teachers would, in turn, use with kids. This meant doing all sorts of manipulative, hands-on, hands-dirty, feet-wet things. We used our nearby school ground environment--the pond and the creek--and developed activities that could also be done in the classroom.

We tried to give teachers, at the end of each session, an opportunity to question why we were doing the things we were doing. We also tried--and I think this is important--to create the kind of atmosphere we would like teachers to provide for kids when they get back to their own classrooms. This is an atmosphere that is very open-ended, where children are free to move, to talk and interact with one another as adults do, or as adults are privileged to do. We felt strongly about the need to establish a different working relationship between teachers and kids, because when you come to look at what environmental education means, it means a great deal of humanism involved in the relationships people have with one another. So we tried to foster this atmosphere in our classroom, and I think we've been rather consistent in deformalizing these "formal" kinds of experiences provided for teachers.

That year we also provided some miscellaneous services: people would run up to us and ask us to help on a workshop, and so we would quickly design the things that we could do. It might have looked as though we knew what we were doing, but what we went through would belie that supposition. I'm not saying our group didn't possess many skills and talents, but we hadn't had the opportunity to wed these together yet at that time when we were being asked to do things for the community. During our first year we also started independent study programs for students; you'll see what became of that a little later.

We engaged in some curriculum trial. We didn't act too honestly in the way we tried out our curriculum: we usually went into the classroom and taught the kids, instead of our teachers teaching it. The teachers were several steps removed from what it was we were asking them to do--we were much closer to it--and so it always looked good to us when the kids were very responsive and doing all the right things. During the summer following our first year we conducted a rather lengthy six-week program and tried to involve youngsters in some basic ecological investigations out-of-doors. Again we were giving trial to our material, but I really don't think we were doing it the proper way.

Our organization during that time consisted, very simply, of a project director, an associate director, a director of curriculum, a director of research and development, a staff writer, and a person with library duties.

During that first year we were incredibly naive about what would happen, because when the Title III project was put together everybody was jumping on the bandwagon and writing letters of commendation and letters of support, giving promises to work collaboratively in this great endeavor, and all this kind of thing. We tried contacting the University of Minnesota, and we still haven't reached them after four years--we haven't developed any sort of working relationship with them at all.

Toward the end of our first year we decided we'd like to try, if possible, to take this ecology program that we had developed with youngsters during that first summer and teach it to teachers, who, in turn, could get involved teaching it to youngsters. So we worked out this very elaborate program; we contacted a friend up at St. Cloud, John Coulter; Dr. Coulter and others there were very happy to cooperate with us. Consequently, we took our program design and tried it on a group of people there. They decided that all they needed to legitimatize the course was a staff person to come and oversee the program. We were free to identify the other people who would be involved in the program, and there would be credit granted for the course. So, we were able to work out, then, a relationship with St. Cloud, and since then, with two of the other state universities, at Bemidji and Mankato.

This summer course was interesting because, in effect, we designed it and we identified the people who did the basic teaching in the course. We decided there weren't going to be any tests--we felt that knowledge was a private sort of thing and you don't have to give it back to someone who calls himself an expert--and everyone would get either a B or an A, depending on his attendance.

One thing that didn't happen--something we're sorry about--is that there developed no feedback mechanisms to offset the pre-service curriculum in environmental studies. Because of this we must continue to do the job of in-servicing teachers who have already been out in the field, who have developed certain kinds of classroom styles of inquiry and interaction with kids that we had to reshape or reform before they could do what we call on adequate job of environmental education. I'm not sure what an adequate job is, but at any rate I think we felt very strongly about the need to expose teachers at a far earlier period in their professional development to some of what it is we're talking about in terms of environmental education.

During this early period we chose to work mainly with elementary teachers. One of the reasons for this is that high school teachers and junior high teachers are departmentalized--they're not going to talk to one another--and so we can't really get an interdisciplinary program going when the lines between the disciplines are so very well marked. On the other hand, the elementary teacher is doing all things in her classroom and she could easily mesh many of the ideas drawn from various disciplines into a really coherent environmental education program. Of course, our real reason for focusing on elementary teachers was that they're a lot easier to work with, they want help and they're not afraid to say We want help, they're not experts, by any means.

We developed no modus operandi, no game plan, at all during our first year. As I said before, we were operating on a basis of fits and starts. Mostly, we developed curriculum materials, teacher programs, and this kind of thing. People began to be aware of who we were. All sorts of people would walk into the office and sit down

and begin to talk to us about some of their concerns. Some of the people that did this were representatives of the various conservation education organizations in the state. I recall Mr. John Tilton, who was formerly with the Suburban Sun newspapers and concerned about a zoo. People from the state department walked in. I don't think we provided them what they needed to really know what we were doing, because we weren't really certain ourselves.

The input, then, our second year, after a variety of programs--not too much different. However, we did have some real contact with real teachers, out in the field. Through our spring and summer in-service programs, we had more of a feeling for what they needed. But we continued to do the same thing. We provided them with more in-service training--not any different from what we had been conducting before--we simply expanded our program offerings. We put in some skill training--sorts of things like photography--and in an experiment that Mike Naylon did, a taxidermy course. (How that really related to environmental education, I don't know that we can say, except that these are skills that can be used in the process of a program.) I think we kept falling back to what NSF had done, and that was that if you're going to be a curriculum project, you've got to recognize the entrenched nature of the existing curriculum. Consequently, the thing to do is develop your curriculum in a supplementary, complementary fashion--in other words, replace something in the existing curriculum, or have your curriculum there as an alternative. So we didn't put together any scope and sequence chart, we didn't decide that certain concepts needed to be taught at certain ages, nor did we accept the notion that certain concepts can only be understood at certain ages. We continued to proliferate study guides, and asked teachers to try some of them in the classrooms with their kids, because we were too busy then to engage in any trial teaching ourselves. Thus a great deal of our curriculum remained unexamined for some time until recent examination by the ERIC group.

We began to work a little bit more with agencies--conservation agencies, state agencies--who were providing us with vehicles for doing things. The Minnesota Association for Conservation Education provided us a workshop vehicle and got us involved with other groups. We were, however, a little bit wary of being involved with any particular group, whether it was a conservation group or social action group or whatever. We found that most of the materials that conservation groups put out were really not useful to teachers. They simply were not translatable into classroom experiences for kids. They were informational instead of the kind of things that would cause kids to get involved. But while we may have dismissed a great deal of their material it was a matter of form not content and we have drawn heavily on it and this is apparent in our products. We simply translated it into something a teacher can use.

Sometime during our second year this thing began to happen--a national awareness of environmental problems. The Santa Barbara oil

spill occurred then. All of a sudden we were confronted by the fact that people might now be aware of what we had been trying to say--but saying so poorly--the previous year. However, we refused to look at the complexity of the problem. Among ourselves we examined pollution, we talked about pollution. During our first year, we even had our series of disastrous public information sessions called "Pollution: Its Consequences." But only later did we discover we were still concerned about pollution the symptom, and not about its causes. We didn't see the causes embedded in this thing. What I'm saying is that we were terribly active about obvious environmental degradation and less concerned about the decisions and the judgements and the mechanics that produced that environmental degradation. We didn't take a look at that then, even though during our year two the impact was being felt by many segments of society.

During this year there was a "watershed" thing happening--site planning. This had been initiated to some degree during the last part of our first year. We got involved in helping schools, districts, individual teachers, examine some of the educational potential of their own school ground. The school campus exists there but it is so seldom used as an educational resource. Michael Naylon, together with one of the new people who joined us, began to examine aspects of the educational potential of school sites, and for the most part the things they proposed involved modification of school sites, modifications that would enable teachers to examine, with youngsters, the kinds of ecological dynamics ordinarily seen miles from town in "natural areas." Michael Naylon and Karl Vogt designed mini-eco-areas which could be installed for study on school grounds. In part this involved making little things like polyethylene-lined pools, and planting shrubs and trees. Now, these are relatively costly operations, but mostly they take a lot of time, and if you recall Title III, everything was free--we were providing all of these services and materials to schools at no expense.

We simply couldn't continue to do this. So one of the things we decided to do (and this happened in our third year) was to get teachers involved in evaluating their own sites. This caused us to look for ways to get teachers out from within the four walls of the classroom onto the school ground, at least away from that very sterile and often vicarious environment provided by the medium of the classroom. This was a big step for us; and for teachers it seems like a very obvious one now, but it didn't seem so then. Of course, one of the rationales for doing this is that schools simply can't afford to bus kids out to nature centers, nature centers being few and far between. Other natural sites are very difficult and expensive to equip to accommodate kids. Thus school site development seemed a reasonable task to take under these circumstances.

Curriculum materials--a little bit more of the same during our year two. We were involved in a lot of things, and it's hard at this

point to pick up some of the threads that carried us on from year two into year three. One of the major things that did happen after this year, during the summer was the evolution of a program that we called Colloquium. We became quite aware, toward the end of year two, that we were not going to be able successfully to foster change in the schools in the way in which we had been going about it--that was, piecemeal in-service for teachers. We tried to think of some other models, some other designs.

We came up with a design for the program Colloquium, which translated means "calling together." This program centered around the development of cadres of teachers who, after their experiences with us, would go back to their districts and implement a program of environmental education. What we tried to do in the six weeks they were with us was to put them through experiences similar to those we had had in our previous two years. We exposed them to workshopping; we asked them, in turn, to conduct workshops with one another, to get the feeling for working with their peers. We exposed them to curriculum materials; and then asked them, in turn, to develop materials that would be useful back in their own schools, tailored to meet their own school needs. We asked them to inventory communities--their communities--to look at some potential education resources of the community. I think this was the beginning of a very strong thrust that's carried us through the past three years--the development of community potentials as an education resource. We did lots of different kinds of things: we walked railroad tracks and examined patterns of plant growth along them; we visited cemeteries and looked at historical implications of births and deaths as revealed by the headstones; we looked at dumps as archaeological digs, to see what man has thrown away over the years, and we looked at those materials which were degrading and those which weren't degrading. Everywhere we were seeking implications for our increasingly technologized society. These were places teachers could get their kids to in 45 minutes, they could get them in and out. Also we looked at neighborhoods. Their structure reveals the way man perceives and uses land.

I wish I could report that Colloquium was a success; I don't feel it was. I think one of the reasons is that administrators had not yet kicked away the stones necessary to do the kinds of things we were talking about. There was a great deal of lip service paid to the importance of environmental education programs, but there wasn't any real, honest-to-gosh support. And so teachers went back to their separate classrooms, and some of the people who worked as a team during the summer probably never spoke to one another again during the following year. Maybe some of this was our fault, because we weren't in a position to follow up as much as we wanted to, to keep that feeling, to keep that closeness, to keep the notion of cadre together. At any rate it didn't happen as we had hoped and

that was one of our thrusts that diminished in importance, although we've not given up on a possible future procedure.

Process--about the same during our year two: hunch, seat-of-the-pants, intuition, and a little bit of experience. Organizationally, we got ourselves a project director, an associate director, a director of programs, curriculum, R & D. Facilities--at the end of year one we moved into what is headquarters right now; we have four or five offices, two large teaching classrooms, and an equipment place. These are the facilities where we carry on environmental education but of course we also use the out-of-doors.

By year three, environmental concerns were really impinging on us, and the nation. We felt that environmental education was now the area in which we could really move. During this period, I think there was a change in our own feelings about developing in-service programs and our curriculum materials. Staff experience by this time was very useful, we knew some things about one another, we knew some things about how we could work with one another, we knew more or less the kind of things we wanted to develop.

We became more heavily committed to working with agencies. The Bureau of Sports Fisheries and Wildlife (BSFW) came to us and asked us to begin to develop environmental education projects that would bring to the classroom new refuge policies having to do with multiple use. There was recognition on the part of BSFW that the refuge managers are probably not the people to conduct educational programs, that the teachers themselves are the people who go out there with the kids and ought to work with the kids, that the refuge managers should be used as resource people but not as instructors or educators. So we began to develop programs to be used on refuge property. One of our staff members now is half-time with BSFW and half-time with us.

At the beginning of our third year, we were asked to do a site study at Hutchinson, Minnesota, which is about an hour away from the Twin Cities. We were simply asked to do the usual site planning--site modification--and why we chose to do what we eventually did, I don't know that anybody can really say. Hutchinson is a small, self-contained sort of community; there's a 3M plant there, some milling industries, and this sort of thing. A lot of people who live there work there--it's a little bit too far to commute. It was an opportunity to examine something about how a community functions and operates--what were the major sources of input in the community, and what, in general, were the dynamics. So, from time to time our staff went over to Hutchinson and began examining the total complex of the community, what kinds of things in this community kids could examine and make some sense out of. And out of this project developed the Hutchinson Study, a series of sixteen or so pieces of curriculum material which attempt to get teachers and kids out together examining the resources of that community.

The major resource is a river, so we asked kids to conduct surveys: How do people use that river? How did they once use it? How is it used now, and what is projected for the future? What's the state of the river? How do the uses of the land along the river influence the character of the river? We also looked at the kinds of things that are problems in small towns--for example, increasing traffic: we were doing traffic surveys, and studies of movement of people through the community. It's relatively easy to do this in a small community. In the pursuit of their own jobs and the pursuit of their own things, how do people interface with one another? Where are the major areas of concentration of people? What does this mean in terms of the evolution of values of the people in that community? What are they talking about with one another and why? All these kinds of things began to emerge. We took a long look at that community. We developed, as I said, a site plan: and we also developed, in conjunction with the curriculum, a kind of self-contained in-service program where the teachers could teach themselves to use the curriculum with the kids. To my knowledge, the program has never been implemented. And again, this begs the question Why? What is it we left out? What is it we couldn't provide for these people? Why is it they did not want to do what we suggested they might do with kids in the community? I don't know: maybe some others have some insights into this. However, we did go over this past fall to conduct some in-service, and give them some directions for how to implement the program. I fear though that it's never been done.

During year three, there was more in-service. We began to tailor our in-service programs to serve some of the contemporary national concerns: we began to look at some of the socio-ecological implications of environmental problems, and our programs began to reflect that kind of change. Our curriculum material was community based. We began to look at a true interdisciplinary approach; it was obvious that teachers teaching disciplines in separate fashion were not going to convince kids that the things that happen out in the community, out in the real world, are all related to one another. Consequently, we had to begin to develop some interdisciplinary models for our own curriculum use, ones that looked at real problems, real issues, out in the community. The kinds of materials we produced that last year, year three, under Title III funds, were problem- and issue-oriented kinds of things--games, simulation sort of things--trying to place people, not particularly in roles or bags or anything like that, but rather place them in the context of the real world in which they lived. We asked teachers to think of themselves not particularly as teachers but as individuals interacting in a community, having some kind of impact on that community, and having the ability to make decisions about what was going to happen to that community and to its environment in the future. Community dynamics became the source of our most recently developed curriculum materials.

At the same time, we became involved in community action. Our thrust had been the educational community, but we weren't really

getting many places in the educational community. Our feelings originally had been that we needed to educate youngsters to make the kinds of decisions, and act on the basis of judgments, that are tempered by some first-hand experiences with environmental problems and environmental concerns: these were the people who were going to vote, and we haven't done a very good job voting in favor of the environment up until now, so let's begin the process of attitude and value building at a very early age. But problems are becoming increasingly intense, and increasingly critical, thus we felt the need, to teach the adults in the community.

There were many adults who had already figured that out. One of the people who had done most in the Twin Cities area, as a private citizen acting on behalf of the environment, is here today; that's Mrs. Shirley Hunt. She is one of those kinds of people that we hope to produce through community action programs. We were able to establish one such program at the evening school of a local junior college; it was called the Environmental Crisis class. We wanted people to bring to the class specific community problems they wanted to work on. We in turn would help them carry those problems through to some kind of resolution, or at least examine them in the context of a much larger picture of environmental management.

We had a modicum of success. Again, people act on behalf of the environment because they're strongly motivated to do so. Or to put it another way, if it hits you in the pocketbook, you're going to do something. I cite as an example what's happened to Lake Minnetonka, outside of Minneapolis. When property values are threatened by the degradation of the quality of the water in the lake, then people begin to act. Then you have the "Save Our Lake" sort of thing happening and the development of all sorts of quasi-governmental units, like conservation districts. So you've got to have people coming to you already motivated and then you can shape and inform their actions and give them some alternatives.

We got involved this summer, after a third year and a previous summer, in urban environmental education programs for kids. We tried to design programs that would enable urban youngsters to examine their urban environment as it is. Our successes were varied, I suspect. We were still hung up on using ecological methods to examine the community, so we had kids out running transits through the neighborhoods, and this kind of thing. At that point we hadn't really built in a sociological dimension, the actual examining of what people feel about the community, what they want for the community, and how they see things evolving for the future in their community. But at least we got kids out of the classroom, in this summer program, and we got them examining some of the various environments and the urban areas in Minneapolis, and maybe we had some kind of success.

A program we helped evolve with Minneapolis for last summer was slightly different. Again it was an urban-environmental kind of thing, coupled with an open school concept. This worked to varying degrees, again depending upon the willingness of the teacher to forsake the security and the confines of the classroom and acceptable methodological style and get kids out examining those things they can around the community.

To summarize, then, these three years we accomplished three major things, and none of them linear, as I said before, mostly sort of an upside-down pyramid. To start with, in-service classes--we proliferated many. Curriculum materials, which began as discrete little investigatory guides, based on ecological content, that teachers could use with kids. We worked with the state in doing some two and a half day workshops, and worked with other groups in doing workshops also. The big thing during this year was our community studies program, which I really can't adequately describe, because it's quite lengthy.

Over this past year, because of our funding problems, the main effort has been to develop proposals which we hope will bring us more funding and keep us in existence for a while longer. After all, once an institution comes into being, probably 90 percent of its energy is directed towards keeping itself in existence, and believe me, this is what we did. At the end of our third year, however, a very fortunate thing happened. Some people in the state were aware of the fact that the science center would no longer be receiving Title III funds (as you probably know, Title III funding is for three years only); they felt we had made some kind of an impact and that we ought to stay in existence. So a group of individuals came together and drew up our constitution, or by-laws, or whatever it is we have, and created the Minnesota Environmental Sciences Foundation, Inc. We are the Environmental Science Center, the education arm of that foundation. It is a public, nonprofit foundation. The Foundation's first act was to begin raising money for us through private subscriptions and donations from industry, and as the staff very well knows, it was our job to seek additional federal funding for support and for continuance. A great deal of the energy we spent in putting together proposals has involved us in community needs. Expert advice and staff concerns have gone into the development of these proposals.

The two projects that we will be working on now are a complete change of direction, and they really characterize our evolution over three years. We're kind of amoebic; we're putting out our pseudopods in all directions to get money and then maybe to do some things that are important, too. One of the projects is a vocational-education project which will attempt to bring kids, at a very early age, into contact with what's called the "world-of-work." It's intended to get kids to look at the contributions of work to the total process of the community, and will probably be a three-year exemplary project.

Our other project is the community studies project. In addition, there are proposals in the process of being submitted to the U.S. Office of Education which will probably result in the creation of curriculum materials for preparing people to work in environmental services careers. We're responding to some national priorities here: the need for manpower in the area of environmental control.

Our guiding philosophy seems to be whatever is right; we're still not absolutely certain how to conduct our affairs on a long term basis. We've had lots of internal changes, reflected in new staff organization; we have Foundation directors, we have executive directors, we have a director of the Environmental Science Center, we have five staff associates, and we get help if needed. I don't know how to condense or distill all this into something that would be a model for an environmental education center to serve one state or five states or the whole country. As I told you at the beginning, we are emerging and evolving. A great deal of what we do depends on where we think we're going to get the money; a great deal of what we have done we've done because people have asked us to do certain things, whether or not we necessarily wanted to do them. We were in existence to provide services and we did so; the nature of those services changed with the kind of group requesting the services.

Our materials--which were strongly ecological in nature, now turn out to be whatever environmental means and whatever interdisciplinary means are appropriate. Their form--mostly teaching guides now, includes some program simulation things and self-guiding, self-directing community investigation action materials. Students go out into the community, investigate problems, and are led immediately to an appropriate action to apply to whatever problem they have discovered.

In terms of our education methodology--we have always been experientially based, and I hope we always will be; we want people to get out there and get involved in some fashion our in-service programs. In-service content has most always been based on our own materials. Our style--again experiential; we want kids to work with the real things of the world; we want teachers to work with them, too, and we want teachers to consider the implications of what they're doing for kids.

Whereas our initial service target was originally the seven-county teaching force; we've now been involved in serving several states. Our population was originally our teachers--this is the population we existed to serve and through them the kids; now it's the total population. Our community services was designed originally to meet the needs of the educational community: now it's the total community. As the mission of our project has changed so has the style of our community service which is now informational rather than experential. The price of community services--we began with something as simple as a school site modification program, and we've now come to the point where we're trying to build bridges between the educational community

and the real community. This bridge-building can start at either end. Incidentally, one of the things we've found out is it's the other end--the community--where the action is.

Our organization--which began as an interlocking directorate kind of thing has now evolved into sets of project leaders; we're very fluid, we accept things as they come along, and people step in whenever and wherever needed. The form--we were Title III and now we're a foundation. Funding--originally Title III again, now there are varied sources.

Some vital statistics about us: Over our period of existence we have produced some sixty curriculum units. We've had over 600 teachers who've had more than twenty contact hours with us in our in-service programs. However, we've probably served something like 4500 to 5000 teachers. We've cooperated with over 47 community agencies. We've processed requests for everything from workshops to walks in the woods with kids to requests for curriculum materials. We've covered probably 70 percent of the districts in the metropolitan area. We've done about thirty site surveys. Our total federal funding under Title III was $668,090.42.

What have we learned about ourselves? We see that we were incredibly naive; we expected people to flock to us and they simply didn't--people wandered in. As I said, we needed more internal organization which was useful and workable and relevant to the skills of the people who were working on the project. We needed to set forth some prime objectives. We needed to be accountable to someone, to a much greater degree. Because accountability wasn't a real big thing, we had the latitude to make a heck of a lot of mistakes--lay away a mistake a day, I think Mike put it. Nobody was really asking us what we were trying to do and how we were accomplishing it, nobody wanted us to put it in behavioral terms. Therefore we needed to anticipate the probable outcomes of our actions; at least we needed a way to evalute those probabilities. Also, we could have done more public relations work. We could have really sought a way of working closely with the schools, for they didn't really know what we were doing. We never had a communications model, I think, that was effective in developing any kind of specific relationships with the educational community. We were there to serve, so we could have spent a little more money, time, and energy in doing things like that; we could have spent a lot less on equipment. We should have arrived at some definitive medium- to long-range objectives and measured our progress against them. At the end of our first year, we didn't do that--again, we weren't accountable.

What did we learn about the educational and academic community? As we've gone through our process of evolving, we've learned that serving the educational community is a very difficult task, because by and large it's responsible to itself. And it's responsible to itself within each unit--that is, within a district, within a school, within a classroom. Schools generally are not responsive to any kind

of national priorities. (I don't think you should go around hanging national priorities over people's heads, but the schools didn't see what we saw coming.) The schools probably don't have machinery for change that we could have locked into, and every time you deal with a school district you are creating that new machinery--that's a very difficult thing to do when you really don't belong. We weren't really ecologically interrelated to the schools. I think this is a real problem. Schools do not regard non-credit-granting groups or institutions, such as we were, as a viable, creditable source for innovative educational input. In other words, we had a great deal of trouble convincing people that maybe some of the things we were doing were important. We all know that schools have little money they're willing to commit to programs, and we had little money that we could directly provide for them, so that was kind of a Mexican stand-off. Schools have as difficult a time as we do expressing needs, so we didn't know where to fit in. Could we have gone in to change we're not certain we would have known what to change. Schools are not risk-takers; we were a risk. This is probably a strong indictment, but we found, in our relationships with the schools, many of them were less concerned about kids and more concerned about preserving their organizational structure. Any kind of innovation which is apt to upset the smooth functioning of that administrative hierarchy as it cascades down to the classrooms, certainly is not going to be viewed very positively. Finally, something I've already mentioned, our tack in fostering change was to use in-service as a basis for creating change in school districts. Considering the amount of time we had to implant few ideas in a few people, to change a few of their behaviors, it simply didn't provide us with the kind of impact that we wanted, at least not the way we did it. I think there must be other ways to do it.

What did we learn about the community? We feel the community is the real source of educational and instructional input. The community is more responsive and concerned about issues, including educational things, than the schools are themselves. We found that the community influences the schools more than anything or any agency. And since we have started to work with the community, I think we have been able to make some changes in the community itself. People are relatively open to change if they're adequately informed and involved.

As for our present needs and what we see for the future? New projects--I've already told you several of them. We're going to be adding staff and maybe we'll get some new facilities. We want to serve the entire state, because in the name of our foundation is the word Minnesota, not Minneapolis. We need a field staff; this means we need money. We need to develop better working relationships with the schools; we've got to set ourselves the task of finding ways to do this; maybe community studies programs could be one of the answers.

The staff needs to get out and see what's going on; we've been sitting in our little cubbyholes for a long time; we need to see what's going on in the nation. There are lots of other groups and programs doing interesting and different kinds of things that we could profit from; we need to see those things happening. We need to develop a mutually beneficial arrangement with teacher-training institutions, whereby we can influence pre-service instruction in environmental education. The staff, and the project itself, needs time to communicate to others via publications, etc., what it is we're doing; we've really been remiss not to publicly expose more of what we're doing. After some of the things I've said today, maybe you see why we're not exposing ourselves publicly--because we don't have any answers. I'm a little afraid that since we are now involved in a different set of problems and projects, dictated by the kind of funding we're receiving from the Office of Education, we may never get the chance to go back over our mistakes, evaluate them, and see what we could have done better: how we could have used our teaching staff, how we could have used our in-service people, how we could have used all of the resources we've been exposed to, in a lot better fashion. It could fall to some other group, and I would strongly suggest that any other group thinking about getting together examine some of the issues I've raised here, in terms of how agencies such as ours work effectively with the schools. In substance, that, I suppose, has been our one major problem and needs intensive examination by us or others.

COMMUNITY ENVIRONMENTAL

EDUCATION

COMMUNITY INTERACTION: AN OVERVIEW

One danger in environmental education program planning is the intramural competition among various groups for the "rights" to the educational program. Environmental educators of all shades and hues must recognize that an individual's environmental education is derived from both formal and informal sources--there are reasons to believe that informal sources contribute much to the lasting elements of an environmental education. Those in the environmental education business should recognize and capitalize on the strengths of both formal and informal activities. School personnel particularly must recognize that school is not necessarily The Way to acquire a comprehensive environmental education.

Thus, school people must look outside the school. Since environmental education deals with more than the natural environment, it must be a community-based program which allows for many and diverse interactions between man, the natural environment, and the man-made environment. The environmental education program in its truest sense permits the learner to develop himself in a broad environmental setting.

Thus communication, coordination, and cooperative planning between groups must occur so that resources are not distilled in competition but magnified in unified planning activities. School people must go to the community, community people must go to the schools, and educators must go to other educators to maximize the potential of the collective expertise available. Since resources for carrying on environmental education activity will often lie in the community outside the usual domain of any one specific group, inter-group cooperation is vital.

A major dimension of environmental education program development thus involves establishing communication between educational groups in the community. This requires making long-range plans involving risk and commitment. Without these long-range plans, the impact of short-term efforts are diminished since results become diffused and ultimately lost in weak communication links. Plans should identify all potential community resources rather than just listing physical sites or facilities. Every community has a wealth of resources for environmental education activity even though they may lack traditional sites. Plans must provide for educating the total community in terms of the historical development and alleviation of its environmental problems. The learner must participate in community activities and the community must participate in providing the learning environment. A positive approach to problem alleviation must be undertaken with people sacrificing their own selfish concerns for that which has greater value: Survival within a quality environment for all.

Those groups which support educational programs have many of the same concerns. These concerns are not necessarily equally shared by all, but it can be fairly said that all educating groups share some mutual concerns, even though motivations may vary.

In educating in and about the community, it is necessary to identify and develop a wide variety of resources. All educational groups should jointly make a "needs assessment" of educational resources to locate potential resources. For example, a needs assessment for environmental education would probably indicate an untapped resource is the business and industrial community. The nature of educational contribution from the business community often comes from what teachers and other educators request. In any event, educational groups in a community must stop arguing about strategies and sources of power and get down to identifying mutual concerns to attack. The art of compromise will play a major role in this process.

Planning for environmental education activity to be carried on in the community eliminates many problems. For example, by accepting the community as the environmental education facility, one avoids becoming preoccupied with the development of specific sites. Energies can be invested to think out resources and their utilization rather than produce tangible products. This lessens the emphasis on some traditional questions such as preparing facilities.

Community environment education program dollars and resources should come from private sources as well as from general taxation. But getting these resources is sometimes made difficult by a desire to do the whole thing now. This attack eliminates many potential funding sources and community resources. People are more apt to invest in something that can be done in a short time period, than in large risk-capital ventures. Thus, planners must invest other capital in long-range planning, and utilize money and resources from more conservative elements to accomplish short-term goals, each of which contributes to the larger goals of the master activity.

Past experience indicates that educators must also engage in political activity and public relations work. To do an effective job in this area requires a lot of "homework". This includes an intimate knowledge of all cultural components in the community and relative strengths and weaknesses of various community components. Of course, educators must see the necessity for educating all the people about their activities.

Effective community environmental education programs concentrate on communicating among groups. All educational groups--including school people--must work together to attain goals of the master plan, rather than only being concerned with their specific domains. Above all beware of overdevelopment. While the master plan for community-based environmental education should be well thought out, it must not become prescriptive. Change and flexibility should be maintained. Overdevelopment can be minimized if efforts emphasize the development of human as well as physical resources.

ENVIRONMENTAL EDUCATION FOR THE TOTAL COMMUNITY

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Educational goals are not only vocational choices but also contribute to understanding ones self in the broader environment. Byron Ashbaugh contends that educational programs contribute to one's acceptance of personal responsibility by guiding value structures and developing skills for environmental decision making. Because culture is an integral part of any educational program, all people and agencies play a role in solving environmental problems through environmental education programs. In particular, Ashbaugh sees the role of governmental agencies in the educational process as one of cooperation with the entire community.

Too often school systems ignore one important dimension of a total planning effort: A definite plan for community participation. Any environmental education program requires a plan to include every community person with some capability for assuming the role of instructional personnel.

Education, rightly conceived, is not vocational training alone but also an effort to understand ourselves and the environment that surrounds us. A new meaning emerging for environmental education is that it brings about man's understanding of his environmental interdependence and develops a strong sense of personal responsibility and the necessary skills for maintaining the environment in a life-supporting condition, fit for all life and fit for living. Major goals of environmental education guide individuals toward clear understandings that:

1. Man is totally dependent on a closed system consisting of people, their culture and surroundings composed of biological and physical elements.
2. This closed system is a web in which all parts are interdependent.

An over-riding consideration is the involvement of all people and governmental agencies in solving environmental problems.

This paper will be largely concerned with the role of a governmental agency in environmental education. The key elements involved in providing for environmental education through a governmental agency are:

1. Knowledgeable staff.
2. Land base.
3. Plans.
4. Necessary development.
5. Cooperative programs involving all segments of the community.

It is the park director who is fully aware of the educational potentials of park lands who will surround himself with a professional staff with capabilities to provide a park system that will tackle the job described by Marion Clawson in an article on state parks in the Parks and Recreation Magazine: (The message is universal for all parks.)

> "Existing recreation opportunities provided by state parks are impressive and valuable; but, state park systems of the future must fill a further role for the people who visit them.
>
> "The type of urban man evolving in the United States lacks any real knowledge of nature; he is far removed from the farm where his parents or grandparents grew up. And he is essentially removed from the natural world in which he lives.
>
> "This lack of understanding is particularly significant in caring for these natural systems. Many a city dweller, while denouncing smog or water pollution, will, at the same time, spend money in countless ways that encourages it. We all want electricity at the flip of a switch or water at the turning of a tap, and in amounts for our choosing! Yet we may denounce some of the means by which the electricity is generated.
>
> "We are the people who want nonreturnable bottles, detergents that wash efficiently, cars with lots of acceleration and speed, something to spray on the rose bushes so the bugs won't eat them, and so on.
>
> "Perhaps most of all, Americans must realize that, within wide limits they can control their own destiny. We can choose unlimited consumption with no controls and ignore what happens to the environment, or we can choose wisely between consumption and preservation objectives by thoughtful planning with minimum controls. We need to neither shrug off the cries of doom from those disturbed about ecological trends and forces nor throw up our hands in despair. We should

become informed, make careful choices, and take the necessary steps to carry them out.

"The state parks can, and should, play a significant role in explaining these environmental options. The state park is often the only natural place which many city dwellers ever see. If they could understand the hydrologic cycle, or the nitrogen cycle, the balance of energy input and output, or many other natural processes or relationships which exist and could be shown in a state park, they would be vastly better equipped to fulfill their role as responsible citizens. If they could understand that pollution is always relative to some other state or condition, this would be a great advance. If somehow their own responsibilities for what each decries in others could be brought home, this might be the beginning of self-wisdom.

"Most state park systems have park interpretation programs (usually starved for funds) which go some distance toward achieving these ends. But there is too narrow a focus on the park situation, and not enough upon the whole natural environment and its management. Some state park systems would be well-advised to undertake experimental and innovative programs in an attempt to teach visitors the basic facts about the natural environment and its management. Some state park systems would be well-advised to undertake experimental and innovative programs in an attempt to teach visitors the basic facts about the natural environment and thus help them to re-evaluate their role in the natural world."

A land base is necessary in an environmental education program. Remoteness of a site can be a severe problem as far as continued community use by individuals, family groups and school classes are concerned. A factor to be considered, therefore, is the proximity of an environmental study area within easy reach by family car, school bus, or public transportation.

Important questions should be raised about the nature of the land itself. Does the site have specific educational possibilities? Is any part of the land characteristic or reminiscent of early America? Does any part of the land reflect the historic growth of the countryside? Has the tract any special natural features -- a brook, river, pond, small lake? Does it have a cliff, rock outcrop or boulders? What are the characteristics of its soils? What kinds of trees are represented in the woods? What kinds of plants are found in the meadows? What about the surviving populations of birds and animals? Which areas of the site will lend themselves to meeting community environmental education needs?

There are cases where even a minimum acreage is not available in one piece within the corporate limits of a city. However, judicious search will often reveal a number of small green areas which will present an impressive total of habitats and many opportunities for a community environmental education program. Often these areas are parts of school grounds or adjacent to them.

In most communities, there are areas or facilities, available and ready to use without cost, that should be considered as environmental study areas. Some of these sites are:

1. Sanitary landfill
2. Water treatment plant
3. Sewage disposal system
4. Highway construction
5. Interchange construction
6. Housing development
7. Downtown area
8. Vacant lots
9. Historical site
10. Flood plain
11. Incinerator
12. Electric plant (steam)
13. Electric plant (nuclear)
14. Farm
15. Industrial park
16. Airport
17. Seat of government
18. Cemetery

It seems in today's world that unless we "plan our work and work our plan," we will have little to show for our efforts and little community participation. Also, a comprehensive plan is a must as part of an application for federal or state funding. A part of the statement entitled "preparation and adoption of park master plans" from the policies of the Genesee county parks and recreation commission shows some of the possibilities of comprehensive planning in getting feedback from the community:

> "Each park (recreation area, conservation area or other site) shall have a professionally prepared master plan of development."
>
> "The views of citizens, civic and service clubs, governmental agencies and other groups, organizations and community interests shall be solicited prior to the preparation of the plan."
>
> "The master plan for each Park, upon completion, shall be presented to the Commission, which shall set a time and place for a public hearing on said plan."

Planning for environmental education areas actually begins with park site acquisition. The acquisition policies of the Genesee county parks and recreation commission is a good example of long-range planning for environmental study area. In the designated county park lands of 12,680 acres, the following areas, which total 2,317 acres or 18% of the parks are zoned for educational use:

1. Fine Arts Center -- 50 acres.
2. Nature Center, Genesee Recreation Area -- 143 acres.
3. For-Mar Nature Preserve and Arboretum -- 374 acres.*
4. Outdoor Education Center; a year-around camp facility and environmental study area -- 1,750 acres.

The average environmental study area must have a minimum of development to make it efficient and safe for programming and to render it resistant to repeated use by many groups of visitors. Large numbers of people will require facilities such as: parking lots, drinking fountains, restrooms, surfaced trails, bridges, work areas, council rings, shelter, wildlife food plantings, over-looks, signs, and outdoor exhibits.

Special emphasis should be placed on facilities to serve the handicapped of the community. Attention should be given to the following:

a. Level hard-surfaced trails that begin and end at parking area.
b. Signs and labels in braille and print.
c. Shelter with fireplace and restrooms.
d. Herb garden.
e. Aromatic trees and shrubs.
f. Garden plots.
g. Seating area made from log sections of varying lengths.
h. No architectural barriers in any structure.
i. Specimens and exhibits possessing tactile significance.

In order to develop an environmental education program that the community will accept, it is necessary in planning to involve the persons in an advisory manner who represent the community in an educational capacity. Such people include: curriculum consultants, coordinators, school administrators, resource managers, personnel from agencies for the handicapped, classroom teachers, governmental agencies, community agencies, and college professors.

The result of broad-based planning will be the inclusion of program elements so that all segments of the community can and will participate. The groups to be served in most communities are:

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* See Ashbaugh, "New Interpretive Methods and Techniques," Journal of Environmental Education volume 2, number 1, Fall, 1970.

Public schools	Boy Scouts
Private schools	Cub Scouts
Families	Girl Scouts
Senior citizens	Campfire Girls
Teenage clubs	Y.M.C.A.
Visually handicapped	Y.W.C.A.
Mentally retarded	Service clubs
Physically handicapped	Colleges
Emotionally disturbed	Universities
Summer camps	Adult workshops
4-H clubs	Garden clubs

In closing, I would like to call your attention to a statement by Dr. Michael Brewer of Resources for the Future who cautions us that:

> "Interpretation plays a basic role in coming to grips with environmental quality problems, although it in itself cannot do the entire job. It stresses problem identification, diagnosis, and the presentation of alternatives for improving the situation. It does not include an evaluation of these alternatives and the selection from among them of the particular course of action to be pursued. This must be accomplished through activities, organizations, and techniques for reaching consensus that lie outside the domain of interpretation."

THE BUSINESS COMMUNITY AND ENVIRONMENTAL EDUCATION

James R. Irving
President, Irving Foundation
Stoughton, Wisconsin

The process of education reaches far beyond the confines of the school to the community, business, and all walks of life, according to James Irving.

He indicates that the contribution from non-school educational sources is directly proportional to communication channels kept open and the quality of the dialog taking place. Too often, "weak" communications are caused by people who don't know what they want or, even worse, don't know how to tell others what they want.

Business and industry must be encouraged to devote educational dollars to longer-range projects which omit propaganda and axe-grinding. To achieve this end, educators need to locate the available resources, and begin some long-term programs of working on and with these people.

My talk deals primarily with communication between the world of business and industry, on the one hand, and the world of education on the other. There are three philosophical points underlying my remarks. First, the good of the child, or the young adult, or the adult, is the paramount thing. That is, if you wish criteria on the nature and quality of whatever materials we use for communication, it may well be: Is this going to enhance the education of the individual we've beamed it at?

Secondly, it is very important to remember that education is a dynamic phenomenon. When I was a boy, you could pretty well adopt a textbook and use it until the cover fell off, because most of the time the material's relevance remained unchanged. Today, the rate of obsolescence in printed matter (or video or audio matter, as well) is so high that by the time we produce it and distribute it, it is nearly obsolete. Education is a dynamic phenomenon.

We are realizing more and more that walls do not separate subject matter areas; subject matter areas probably should never have been separated. I am an exponent of the functional approach in education, rather than the structural approach. Let me illustrate this. As beginning students in fundamental human anatomy, we studied the nervous system, the muscular system, the skeletal system--systems right down the line. But when you became a practicing physician this did not help you very much, neither from a surgical standpoint nor from a

first aid standpoint. As freshmen, we were quizzed on structure--we were examined thoroughly on the muscular system and skeletal system and nervous system. But our medical school seniors were asked something far different: What happened if your wrist were severed right through? What various parts of the total anatomy would be suffering? You begin to see a group of structural systems operating together, which we call functional anatomy. This suggests my basic view of education--a functional process, a dynamic phenomenon. To quote one of my idols, Margaret Mead, "Education is a never-ending experience." It was certainly an unfortunate outlook we had when we assumed that having completed a certain segment of our schooling--grade school, high school, college, graduate school--that was it, it was a book to be bound.

If you want to get a real stir, a real spine-tingling experience, read Alvin Toffler's book Future Shock. Toffler does a scholarly job, and he graphically illustrates my third underlying point--namely, the velocity of change. Toffler never uses that expression; in fact, I started using it myself about thirty years ago when I stumbled onto all sorts of psychological maladjustments among my students. In some of my counseling work, I began to observe that things were happening just too fast for some children's brains to comprehend--they were cracking up, doing all sorts of silly things. This velocity of change is also a moving factor in contemporary education.

Of the past thirty-five years, I've spent about half as a teacher and half as an executive in industry, and I'm going to draw from these years of experience. A basic conclusion I've been forced to make is that industry and business do a pretty horrible job of getting through to the teacher, and then when they do manage to reach through, the educator really doesn't know what he himself wants. So we have this miserable situation of frustration at the beginning, frustration as the theme, and then the grand frustration at the end. In many instances, communications are just that futile. To make matters worse, getting to the educator is usually accomplished by an industry's retaining an advertising agency or a PR firm, who in 99.9 percent of the cases don't know the first thing about the field of education. Some PR man meets this very staid, very positive educator who already has been sensitized to such folks. And what surprise there is should the educator feel this soul is not really so bad as was expected! But in the end there's usually disappointment, because neither does the educator know what he wants from industry nor does the PR man know education's needs.

An interesting thing happened in New York many, many years ago. I was going to be the Great White Father and bring together industry and education on one grandiose scale. We were going to take the whole thing and do a big magazine article. At the outset we had the purchasing agents from Columbia University, New York University, and several schools from the New England area sit on one side of the table, and the representatives from industry sat on the other side. For one entire morning, when they weren't staring each other down across the

table they were saying rather unkind things about each other. After lunch--and food does wonders, you know--we met again, and as a result of a few choice questions that either the editor or myself threw at this group, something very beautiful evolved. Those of you who are interested in group dynamics would have been very interested in this--it was a good case history. After a half day of throwing brickbats at each other, they realized the potential of this whole gathering--they were not on opposite sides of the fence, they were really on the same side. They had different problems, they may have had different philosophies, but they were able to reach common ground on the first philosophical point of this talk: The good of the child, the young adult, or the senior adult, is the paramount thing. So here we were throwing bricks at each other when we should have been considering the purpose of a meeting of this nature. It was a revelation for all those who attended.

Many years ago the Coca-Cola company developed what they called the Elementary Science Laboratory. In theory this was to be a giveaway to schools and a part of the PR program for Coca-Cola. It was beautifully done, one of the finest things I've ever seen developed by an industry. What happened to it? How many of you folks have ever heard of this? In most groups where I discuss this I may get a show of two or three hands. What was the story? Wherever you see the name Coca-Cola Bottling, that is an independent organization that has been franchised by the home office to bottle Coca-Cola. Now, Coca-Cola allots these dealers or bottlers a certain percentage of their sales for promotional activities. Well, each one of those good Coca-Cola bottlers had already committed all of the monies they had for that sort of thing; they were sponsoring a Boy Scout troup, Little League, a junior choir--you name anything in the field of education and some bottler had a piece of it. Then came the Elementary Science Laboratory, something that I consider far better than anything Coca-Cola has ever done. Well, it never got off the ground. This thing cost the dealer eight dollars a copy--well worth it, but if the dealer didn't have the money the school could have been on its knees begging for it and it never got through. It's essential for us to consider seriously how these wonderful things are distributed, and if a company has set up its own roadblocks, no matter how fine the product, it's useless.

I'm a charter member of the National Science Teachers Association, and many years ago I was involved in a committee whose purpose was to evaluate business-industry sponsored materials. Then two years ago, we undertook a research study to see what was needed from industry in the field of scientific education. We sampled two thousand teachers from the elementary through the junior college level to find out just what they wanted from industry. We had better than a 50 percent response. (I'm not too thrilled over that, because in other studies we've reached 80 percent. Since you may want to do this sort of thing someday, let me provide you with a very helpful technique. Prior to sending the research instrument--that is, the survey--we sent a post card alerting each recipient that he had been chosen to receive this survey instrument. That will generally boost your response about 20 or

30 percent--perhaps even more. It's absolutely magic.)

What did we find out? I'll just run through a few highlights. The traditional subject matters were mentioned by an overwhelming majority of teachers at the various grade levels. I'm sure you realize that in the field of science there has been a tremendous upheaval during the past twenty-five or thirty years, but the overwhelming majority of our respondents indicate they were still following the traditional subject matter approach. And the majority of teachers indicate that the teaching materials in their particular field were inadequate.

Of films, models, transparencies, books, etc. which are the most useful? Booklets. Now, this is interesting, because whether the respondent was aware of this or not, a booklet at its best may not cost the producer more than thirty-five or forty cents, and when it become obsolete we have no qualms about throwing it away. On the other hand, if something costs eight or ten dollars, there is always the tendency to hang on to it, not because it's worthwhile but because it's got so much money invested in it. The following items are considered least useful: computer time, instruction video tapes, TV or radio programs. What audio-visual equipment is the most available? The overhead projector--97 percent of these respondents said they had access to one. Sixteen-millimeter projector for movies--95 percent. Most valuable guides? Here's something you will be interested in: Most valuable guides to the availability of free and low-cost teaching materials. Professional journals were considered the most valuable. And that is only one reason why it is beyond my comprehension that there could be an educator in a classroom on any level who is not a member of some professional group related to his field of interest.

In this survey we had three open-end questions. (If you ever want to drive a statistical man crazy, put open-end questions in your survey instrument--it drives them to the moon and back. I honestly didn't know this at the time.) I'm on the verge of publishing a book containing the responses in these three areas; it will have the title of What the Teacher Wants From Industry. From a high school respondent: "I would like to see more interrelationship with other subject matter areas--social sciences, math, the arts, etc." That's wonderful--that's functional, you see. Knowing of its availability is a problem. (By way of preface to the next response, I should tell you that Bell Telephone and Shell Oil were judged the most helpful in the way of audio aids to education.) Another high school respondent criticized Bell Telephone because if General Telephone or some other phone company were in your specific area, Bell would not give you Bell Telephone movies. I think this is a horrible misunderstanding at the upper levels of the great American company. I believe their whole program would be greatly enhanced if they were more generous--more dedicated to the learner. These are things that plague all of business and industry communications.

Again from a high school respondent: "A large number of the materials seem to be written to fill time, written by non-teacher-oriented personnel. Movies available to grade schools very seldom limit themselves to one or two concepts, but seem to aim at a broad audience and try to cover too much." Another: "Business and industry should realize that most high school instructors have 160 to 170 students, not 40 students. Any material that is given is usually for about forty students." There's another comment on this same response which alludes to the purpose of this whole survey--this respondent just nicely stumbled into it--"why can't a group of teacher-oriented people get together and tell industry what they'd like, and from that develop materials and cross this barrier between school and industry?" Summing up the survey results, we noted that communications evidently are near zero, or at least they were two years ago when we surveyed, between business-industry and the field of education.

About 99 percent of all the materials that business and industry furnish to educators has been grinding an axe, in one way or another. As an executive secretary of a national trade association, I had to muster a lot of courage to sit in committee meetings and tell top executives of the country that they shouldn't grind an axe for their industry, that the primary objective of all good materials was to benefit the student, not to sell him the virtues of some industry. It took me ten years before this particular group would condescend to ask me: "What do you think about it, Jim?" For nine years I told them, the tenth year they asked me. I tried to point out to these people that here was an industry--the scientific apparatus and instrument industry--that depended upon the educational system for well-trained individuals, and all that they were contributing to the education of their future personnel was propaganda. But it was a ten-year struggle.

Perhaps your greatest resource in communicating with industry is the trade association. This will shock you: there are twenty thousand trade associations in this country--national, state, and local. I defy you to pick up a telephone directory, flip through the Yellow Pages under the term "Associations," and not find one. In Madison we have many of them. In Milwaukee, in Chicago, in New York, we have many. Washington is overflowing with them. There is even a professional association of associations: the American Society of Association Executives, 2000 K Street N. W., Washington, D. C. 20006. They have a directory, which I doubt they will send you--this shows right from the beginning that there may be a breakdown between you and one of your major sources of information. I'm sure though, that they will give you a listing of those trade associations in your particular field of interest. Should you want a directory of all trade associations, you can buy one from Columbia Books, 424 Southern Building, 15th and H Streets N. W., Washington, D. C. 20005. There's no reason why you shouldn't have the Columbia Books directory in your library; your librarian should be able to get it for ten or fifteen dollars.

What do you get from trade associations? It all depends upon who their executive secretary is, I suppose. Let me exhibit some of the things produced either directly by trade associations or under their sponsorship. Here's a booklet addressed to the question, How do you begin a quality control program in industry? It came about because Sears Roebuck was instituting quality control in all of their candy kitchens. Their suppliers were these wonderfully skilled Italian and Greek candy makers, who had been supplying Sears for generations and who passed their secrets on from father to son. Abruptly, Sears said, "Two years from now we either buy your candy on specifications or not at all." I was sent to these regional meetings Sears set up all over the country to tell them, "Now, don't feel too bad, we're going to help you out. Here's the ABC of the thing." This booklet grinds no axe, it's a service type of thing. The sponsor's name is so small that you have to have pretty good glasses to read it. We were interested in one thing: quality control and research--insure your product in tomorrow's market. Of course it helped sell instruments and apparatus, but this was not our purpose; we didn't initiate this, Sears Roebuck did, but we felt as long as it looks like a national trend we better do something about it.

After Sputnik I, we realized that the public was badly informed on matters of science, that school boards, administrators, teachers, the citizens, just did not comprehend what was needed in this resurgence of science. So we did a very exhaustive study of reading materials--booklets, brochures, magazines, most everything that you could find at your library--and we called the resulting publication Closing the Gap between National Awareness and Local Action. This was the sort of thing that the industry's top executives looked at many times and said to me, "Jim, I hope you're not spending our money needlessly." I said, "We're not spending anything, we're investing money in something that's badly needed."

One of the weakest things industry can do, educationally, is to take X amount of money and turn it over to someone else to produce something. Personally, I've always felt that if you have that amount of money it's more fun to become involved with it yourself. But here's an instance where we turned twenty-five thousand dollars over to the National Science Teachers Association and they produced a booklet: Science Facilities for Our Schools, K-12. The project was led by a man at Ohio State University together with the late John Richardson. The grunt and groan work on this thing was done by Fred Schlessinger. This was an outright grant; the only axe grinding was a tiny acknowledgement saying, "Made possible by a grant from the Scientific Apparatus Makers Association."

Another source of help for you in education is the national Chamber of Commerce. They have an educational department and all you need to do is write them directly at the Chamber of Commerce of the United States, Education Department, Washington, D. C. One really great source--and I recommend it highly, but don't think it's grinding

an axe--is Government. You can get on the mailing list of the Government Printing Office, Washington, D. C., and every month you receive a list of all the publications coming out. They will also send you catalogues of the prior publications. Millions of dollars are invested by government in publications in your particular field.

As a company executive and as a former educator I was aware of the late Gene Doty's Science Teachers Calendar, which was done in a very modest manner. I contacted Gene and said we were very interested in doing something with this thing, perhaps adding something to it, keeping it up to date. Ultimately we came out with this updated Science Teacher's Calendar; it shows the dates and events that have gone down into history in the field of science and science education. Actually what it is, if some of our science teachers would take the trouble to present it properly, is a terrific science course in itself. I might explain that I am very, very biased toward teaching science through its history. We teach beautifully through teaching the history of something. There is one legitimate criticism of this calendar. A woman who was working in the Detroit area with a predominantly black population called my attention to the fact that we had not given due attention to, nor information about, black culture. And she was absolutely right. I know we had G. W. Carver represented, but after all Carver is only one of many black scientists. You see how innocent you can be? Anyway, if this were to be reissued, we have research on it now that would allow us to better represent ethnic cultures.

Here's a little giveaway we use, a summary of fundamental inorganic chemical reactions. On a single page we have the whole year's chemistry course. It's something I did when I wrote a text and I just pulled a chart out of it. Again, no axe grinding--only our name was on it, in small type. Let me call attention to one of the most beautiful things done by industry. I've used it especially with our elementary workshops. It was done by Westlab Educational Services. It's called The Thrill of Learning, one of the most inspirational brochures I've ever seen. I'm sure you'll shudder a bit when you see what they've done to the butterfly. These are actual butterflies which have been incorp rated into the paper--also leaves and other objects of nature. Buried at the very bottom is the name Westlab Educational Services.

I've told you what a great resource you have in the trade groups of industry. But I should caution you that this is a double-edged sword. I don't know how many hundreds of things I've evaluated in the last twenty-five or thirty years as a National Science Teachers Association reviewer from trade associations. I remember a beautiful thing done by the Carbonated Bottlers Association, who wanted to move into schools with beautiful portrayals of the value and the health--yes, the value and the benefits--of carbonated beverages. Well, as a chemist I know that we're grinding an axe here, both from a dietetic and a chemical standpoint. This was turned down, it never got into the packet which NSTA sent to all of its members. I could give many illustrations of beautifully produced materials which you will not use, or you won't if you're in your right mind, because they are definitely

grinding an axe and they do not support the primary thesis of our discussion--what's best for the child, what's best for the student.

Again, professional society memberships: Get on committees, try to move some of this dead earth and lethargy to the point that at least one of your committees meets face-to-face with the industry of your interest. Sit down round a table and talk this thing over and tell these folks how to invest their money if they really want to help you. Relationships between an individual industry and schools--I know a lot of this happens in a small community that has a big manufacturing unit. You develop pretty close ties to companies like that and it behooves you to work for a relationship of mutual benefit.

If you are in industry and make use of a school consultant (who I hope is a teacher or at least a former teacher), make certain that your consultant isn't grinding an axe. This axe grinding works on both sides, and especially in the field of science education. Are there any biologists or former biologists here? We had textbooks in three colors--green, blue, and yellow. You were either an exponent of the green version, the blue version, or the yellow version--you became a member of a cult. And if you were hired as consultant I'm afraid you were not quite fair with your employer, because you were biased. In fact, you never got through the summer institute unless you were biased. There's a good article (which, in all modesty, I was the author of), "The School Science Consultant's Relationship to Industry," where I tried to point out the role of the school science consultant. It is published in The Science Teacher, February 1967. It's a rather short article, but it's a good screening device for those of you in industry who want to retain a consultant and don't know exactly what to look for.

Related Questions and Answers

Q. First, a comment: I worked in industry when I started out and they were giving away all kinds of handouts, too. I found that I got a better reception for these materials when I charged a small fee for them. There aren't that many teachers that will turn a thing down when it comes free, but they will value it more when it has a price tag. Now, could you comment on the sort of field testing that is given to these educational materials?

A. For the materials I've had anything to do with, we piloted everything before we printed it. We took test school situations, we used school consultants, we produced these things, and then we ran a pilot on them in various schools throughout the country to get their feedback prior to the final editing and printing and distribution. Also, these materials were usually reprinted two or three times, and were updated or revised between printings. We too found that our distribution was better in most instances when we sold them.

Industry is very conscious of the pilot run; any producing industry pilots a product thoroughly. I should point out, though that again our rate of obsolescence is so fast that if we do a good piloting job and a good writing job and production job, then the probability increases, higher every day, that it will be obsolete before you get it out.

Q. Salesmen come to me and say their company has tested a certain piece of material and they'll flash a couple hundred letters they've gotten from schools endorsing it. Apparently it's just a great piece of material. But how am I to judge? I suspect that much of this so-called school testing consists of one-shot trials. Often these things end up as just one more piece of material for the students to pass around.

A. Ideally, the only material that should be of any great worth to the John Jones School, let's say, should be the material based upon the student population of the John Jones School. Many years ago I received letter after letter asking whether I'd be willing to share our chemistry curriculum with them. My usual response was practically a form letter: I'd be happy to share it with them but in no way did this sharing mean that it would be of any use to them. I spent about twelve years developing this curriculum for the students of this particular high school, and for them it was pretty good. Forty-five miles down the road it could have been a complete washout. Of course, the significance of this point will vary with the instrument. For instance, for going into the metric system what would be a better educational handout than a metric stick? I don't care what school a thing like that goes to it's pretty good. On the other hand, a brochure by the seed Council on how to enjoy dandeliions wouldn't be too good for Alaska.

Q. What is the possibility of somebody picking up the tab for teacher training workshops?

A. I believe you have hit on something which this country needs badly--that is, the support of teacher training by industry. What I would really like to see is a teacher conference where whoever is sponsoring it will say: "Now look, we don't have an axe to grind. What do you believe would make you a better teacher? How can we help you accomplish this? What can we do to help you develop as an individual?" I don't like the attitude, on the part of a sponsoring group, that you have no brains, you have no imagination, you are a robot, and here is your cup of tea. Certainly it insults the dignity of the teaching profession to say: "Here, Mr. Jones, is your course of study. Now, we realize that you may not be too adequate. Hence we are setting up a summer institute for you and we'lldo Block 1 on Monday, Block 2 on Tuesday,..." I recommend wholeheartedly that industry set up teacher conferences, because the less industry does in an attempt like this, the more government is brought into the picture. And some of us don't believe that this is how we should be operating--at least not exclusively. I only caution that industry should not grind an axe.

Q. Why doesn't industry take a clue when it is given to them pointblank? You've mentioned that Shell Oil and Bell Telephone have some of the finest aids one can get. Yet, it's hard as the devil to get them. You have to sign up, in certain areas, a year in advance, and then when you do get them you're restricted on how long you can have them, you're told that they can be used only in the classroom when having a parent group in, and so forth.

A. This is where I strongly recommend committee action on the part of your professional society. Shell Oil and Bell will sit down with your committee and I'm sure that you might arrive at some happier arrangement.

Q. We have an industrial company in our town that pours concrete and sewage into the Wabash River. Now, how can I go to that company and tell them that I would like them to help me with resource materials or information on environmental problems? Shouldn't every penny that they can spare be devoted to the acquiring of pollution abatement equipment?

A. Of course I'm not on their staff, so I cannot speak for them. But taking a general situation, I suspect that in approaching them you would encounter such a maze of communication channels, particularly now when everything is so emotionally charged and heated, that it would make an excellent communications study--how to get to them. But I'll tell you something which I believe sincerely: You <u>can</u> get through to them. It's just like this fancy New York conference--you've got to get to know each other and like each other as human beings before you can get to first base with any of this stuff. In the end, the company that's smart and that's wise will come up with the money for pollution abatement equipment, but they do not have to cut short other areas, like helping out educational systems. I know companies that have invested millions of dollars on pollution abatement, but I don't feel that they should use this as an excuse for forgetting about education.

A SCHOOL AND SOME E E VOLUNTEER ORGANIZATIONS: A CASE STUDY

Paul J. Olson
Principal, Midvale Elementary School
Madison, Wisconsin

Paul Olson demonstrates how schools can work within their communities to contribute to broad community-based education programs. He shows how school personnel can aid community educational programs and environmental education activities by working in non-school educational capacities. School people's source of power and their community impact can be greatly enhanced by seeking such interactive modes.

In fact, educators must work outside the school to really advance action-oriented programs. Olson reemphasizes a point made throughout the workshop: Communications through newsletters, etc. and working relationships with non-school organizations are vital for community-supported, effective environmental education programs.

On this list of things describing myself, I put down first off that I am a school principal--that's how I make my living. Another thing I put down at the bottom: I have always been a member of the Dane County Conservation League. I think that's rather important if you are to understand me at all--I come out of the Rod and Gun Club movement. I'm one of the bloody-handed killers, a member of the so-called Sportsmen's Club, who for the last few years at least have been looked upon with a great deal of disdain. But I, for myself, vigorously defend my role. Many of my friends look on me as being rather strange--spending a great deal of time in saving things and yet taking great delight in dropping a duck that gets too close. I think ducks should be taught some things, and I see myself as having been put on earth to teach ducks to be more wary.

I'm supposed to talk to you about schools and school people and how they get things done in the community. First of all, you've got to have a functioning organization, you have to have some organizational roots in the community. At this moment in history there must be a million organized groups in existence, so you don't have to start a new one. If you're already involved in an organization, then at some point you've got to move in and take it over, to bend it to your particular goals. You get yourself to that stage by getting elected to various offices. How do you get elected to various offices? You show up. "Available Jones" will always wind up being president if he hangs around long enough, and if you don't believe me ask Richard Nixon. Somebody's got to make the arrangements for the Rod and Gun

Club to get the smoked carp for the next meeting; you be on the spot to do it. These sorts of things are the kind that school principals are very good at. They can order smoked carp and make sure it arrives: this is the nature of the principaling game--sort of, at least.

A previous speaker mentioned there has to be a certain basis of respect, at least guarded respect, between you and the people with whom you work. Once again, I believe this comes rather easily in the school business. School teachers are not thought of nearly as highly as they were some years ago, but they do represent fairly respectable members of the community. And if you're in a town for a long enough time, you get to know an awful lot of people. Next year I sign my forty-second contract in the Madison schools--that's almost a career (if it isn't I won't have time for another one). Forty-two years I have answered the school bells in this town, and I don't know how many thousands of children have gone through my classes and my office and my school forest activities. Most of them now are up there in the power structure someplace, and for the most part we have a good relationship. So it's possible, if you stay in a town long enough, to worm your way surrepitiously into the power structure by way of the school system. To begin with, they know you aren't a very dangerous sort of person--there aren't any militant warriors in the school system. And a former student will remember the time you gave him an A on something or other, or the time you did something for him. So a school person can work his way into the consciousness of a community if he stays there long enough. Phil Falk, who was superintendent of schools here for many, many years, said, "You ought to stay in a town long enough to live with your mistakes." That's indeed a sobering idea and maybe it's a good idea.

Much of my conservation work is not directly school-related. The Nature Conservancy, for example, isn't really related to schools, except at the university level. Here in Wisconsin, the Nature Conservancy has acquired thirty-five separate tracts of land, and we're picking up more all the time. In fact, next Friday we're going to be picking up a chunk at Green Bay, a sizable chunk--$140,000 worth. Not so large a piece of land really, but awfully expensive for a nature type area. Most of these have gone to university systems. The University of Wisconsin at Madison has gotten quite a number of them, the University of Milwaukee has gotten some, Parkside has gotten two or three, Green Bay has received Toft Point, and Lakeland just received a tract. Around Eau Claire and Oshkosh, we'd like more land.

The dream of the Nature Conservancy is to surround every institution of higher learning in this state with an outdoor laboratory, an outdoor area--not so much for use as a recreation area as for a scientific study area. We have indeed worked on this and been fairly successful during the past ten or eleven years. In terms of money, we're worth pretty close to three-quarters of a million now. With that, along with the Prairie Chicken Foundation, may I present a miserable

little school teacher who dug a million dollars of private money out of this state in the last ten years. I didn't think I'd make it for a while, but I've got it.

I'm sure all of your states have chapters of the Nature Conservancy. This is a private, national organization (and a little bit too national, in my opinion--they're always looking over your shoulder and giving you Big Brother advice, when sometimes you'd like to cut corners a little more rapidly). Their job is to acquire land--land not for recreation purposes as such, but for scientific purposes. (Not that there aren't some scientific things that happen in recreation areas.) Theirs are the crown jewels; then there are the lesser jewels acquired by the state chapters, and we claim that we have been gathering up the crown jewels of Wisconsin.

I have personally saved "the last prairie in Wisconsin" six times, and I'm sure that there will be another one showing up within two weeks. This says two things, really. First of all, it says something about the exaggerated viewpoint, or the exaggerated statements, which enthusiastic ecologists often give. I remember when we bought Abraham's Woods, our first area, it was supposed to be a carpet of wildflowers--you could step on them all over. I thought I'd better not go down on these crutches, I'll ruin the place, much more than other people. Well, I managed to get through without causing excessive damage; there were a lot of flowers there--yes--but you know these exaggerated phrases. So one reason we save The Last so many times is because people exaggerate.

The other point is that we're still discovering The Last whatever. Within the last two weeks, we put down option money on an area here in Madison which will probably be used primarily by a city school. This is our first venture in that direction. This little piece of woods we discovered, within the city limits of Madison, represents a unique thing. And the University didn't even know about it until after the bulldozers started moving in there--and the University at Madison is a competent university, certainly one of the great universities of America. Here is a piece of woods which has got a climax maple forest understory, and oak up above that. Running through the woods diagonally is a break-off between prairie soil and forest soil. Furthermore, it represents the fringe of the trilliums--from there north and east they are quite abundant, while for example in my school forest to the south there just aren't any. Some things have happened there over the years which are unusual and should be studied, and a major study can be made. Part of the history of Dane County, at least its ecological history, can perhaps be unraveled here.

Now what was our situation with this woods? The area is small, it's close to school, its delicacy was likely to be overrun, the chances are we'd lose it by overuse. But the chances were certain we were going to lose it to the bulldozer if we didn't buy it. So what do you do? You gamble. Maybe we can hang on to it, maybe we can somehow develop this decency among people, these roads of

understanding into the human heart that someone earlier spoke of. Maybe we can do this, but it's damn sure that the bulldozers would get it if we let it go. So we went ahead.

Prairie Chicken Foundation is another one of these conservation things. We now own 11,000 acres of land up near Plainfield, Wisconsin. Fifteen years ago that land was quite cheap--thirty or forty dollars an acre--but now it's a lot higher. The land we own sits in a great central sand plain of Wisconsin. When I was a kid we called it the Great Dead Heart of Wisconsin; now it's known as the Golden Sands, because just a few feet down is all the waters of one of the great aquifers of the world--all you have to do is put a pipe down and you can grow a mountain of potatoes. So the rush is on up there, and land prices have gone up. Well, for eleven or twelve years the prairie chicken population declined, declined, and steadily declined. And you probably know that a prairie chicken census can be made quite accurately. Each year we went back to our millionaire contributors and they would ask, "How are you doing this year, Paul?" "Well, we're down a little." The next year, "How are you doing this year?" "Well, we're down a little more." And all the time we told them, "But the conditions are right, the cover is right, everything is right." If you believe in the habitat theory, the bird was bound to respond, yet year after year it did not. I begin to wonder if the habitat theory really was truth or was another one of these great myths. Anyway, last year they went up 65 percent, this year they went up 40 percent. We are now convinced that we will be able to maintain a healthy-sized prairie chicken population in Wisconsin. The Prairie Chicken Foundation, of course, has nothing to do with the schools, but it was through the schools and through involvement in the community that I managed to get into a position where I could do something.

Twenty years ago we started our summer school program here in town. I had just become a principal, after twenty years of laboring in the vineyard, and I didn't know precisely what to do with myself. I had a son in ninth grade who had a number of friends, and knew I could con them into a deal. So I went to the school board and said we wanted to start a work-learn program during the summertime. The Conservation Department was operating a stream improvement program out in the Black Earth Creek, and I knew most of these people in the Conservation Department. The school board said Okay; the state Department of Education said Yes, they would permit the schools to grant credit during the summer for that sort of thing. And so we started. We worked for one month on stream improvement only. Nowadays we're talking about involvement, you know. It's not just to love something intellectually, it's to go out and do something with it. Twenty years ago we were doing that in Madison. We had these boys working for a month out there in the stream--and not for pay. They carried their own lunch; we did transport them back and forth; we gave them a credit in school, which in most cases they didn't need; and we didn't pay them, and we still don't.

The next year the foresters came along and said, "Paul, you know there's more to conservation that just stream work. We ought to have a forestry program." That was fine, but now where were we going to get the site? They looked around a lot of places and didn't find any. I finally came up with a brother-in-law who had a farm and a piece of woods out near Black Earth. Now my brother-in-law wasn't too smart--he let us go and work in that woods. And so the next year we moved into a forest management operation. (One thing that always delighted me when we went up the valley out there: We went past the home of my wife's ex-boyfriend, and every morning at about 8:30 when our bus would go by there'd be 35 kids with their hands over their hearts, in memory of what might have been. I thought that was very touching, but of course they were under orders: at this point you put your hand over your heart.)

Then about twelve years ago, one of the real operators in Madison, the late Joe Jackson, the man who more than anyone else was responsible for creating the Arboretum, said to me, "Paul, we've got to have a school forest." And so he went out and dug up the money to get us a school forest. Joe was the last of the great pirates, in my opinion; he could indeed get other people to give money. I remember him talking to Michael Albrecht, who is an old-time name here in Madison. Joe pointed out some property belonging to Albrecht and he said, "You know, this would make a wonderful girls' camp. Let's walk around it." So they walked around it, and Michael said, "Yes, it would indeed, but it would be awfully expensive." And Joe said, "Mike, I wasn't planning on paying for it." Now, that massive effrontery sometimes works, and in this case it did--Albrecht wound up giving him the place. Joe got me a school forest too, about 300 acres. It happens to be a pretty nice piece of forest--it is undisturbed, basically. It was, of course, originally an oak opening, like most of the woods around here, but it's an oak opening grown into a forest in the past century. Any number of people have done graduate work there, Professor Cottam did his Ph.D. thesis there, and projects are going on there all the time. As a matter of fact, this is one of the sites for the international biological program of the universities. They're working primarily in the Wingra basin area, but they also need what scientists call baselines of ecological health, and this is one of the places they selected as a comparative baseline of health. The other one they selected was the Baraboo Hills, which is part of our Nature Conservancy project, so I was delighted to tell my friends from the University, "Yes, you can use my areas, the two gem areas in southern Wisconsin. I'm delighted to have you folks use them, but use them carefully." What I'm saying is, there's some pretty good stuff there.

We operate various conservation programs in the school forest, and we still operate the stream program. We have built a camp, and last night there were 105 kids camping out there in an area which really only had room for about 80. There must have been some very cold children this morning. We have, I believe, eleven or twelve naturalists who guide tours. There will be no day, from late April

until the last day of June, in which there will not be at least 200 to 250 kids in the forest on guided tours. My boys that work with me in the summer have grown in number to something like eighty, and I now have ten men working for me. (You see how the bureaucracy grows--this is the nature of bureaucracies.) The teachers of course love these jobs working in the summertime in the forest; these are the choice summer jobs in the Madison school. And after a while these men do learn something about the nature of the work. The first time they're on a stream, I'm sure that they need considerable guidance from the Conservation people. But after working four or five years, most of them know as much about constructing a boom cover or an in-stream device as anyone else does.

Those are some of the things which have given me pleasure to have something to do with over the years. For the most part they worked very well. Closest to my heart probably is this summer work-learn, youth-involvement program. And also--I don't know exactly why--land purchasing. As far as buying lands is concerned, I'm an Old Testament prophet--I am convinced that here indeed is truth, and so forth. One of the recommendations of the task force, which was included in the Governor's message, was a switch in emphasis from development to land purchasing; the amount of money which will go into land purchasing has been doubled, taking away some money from development. My philosophy has always been: Get the land first, we can always develop it later. Maybe it's better if we don't develop, but at least get the land. And if you're going to control land, you're just going to have to buy it--that's all. If you depend upon such things as conservancy zoning, I think you are pursuing a myth, because sooner or later somebody with real dough is going to come up and want to change it, and it's going to change. You better own it. I am also somewhat suspect of easements--I am a free simple man.

What I'm trying to say is that it's quite possible, if you are determined enough, to gather around you sufficient people of similar interest,and to accomplish something. Also, I would agree with an earlier speaker that industry is a very splendid place to get your money, although I think he was speaking about industry educationally and I'm speaking about gifts. After all, it takes an awful lot of five-dollar memberships to make up a thousand bucks, and a tax-deducting organization that can give you a thousand dollars eases the burden enormously. Now, there are those who say that some of the people you get money from are bad people. Well, to begin with I'm not so sure I know altogether what's bad, and secondly I don't really care. As far as this particular operation is concerned, I am basically a parish priest: I know there is sin in the community and I am against sin, but if I can pick up a couple nickels for the girls at the convent to make the thing run, I'll take them from wherever they're offered. If the job is worth doing, where the money comes from doesn't really matter to me. In recent years there's been lots

more federal and state money around than used to be, but there's still an awful lot of private money, and everyone is always intrigued when you can come up with some citizen money.

Related Questions and Answers

Q. How can you coordinate the activities of all these organizations which are intent upon doing their own thing?

A. First, I wouldn't know how, and in the second place I'm not so sure I'd want to. This may not be a popular viewpoint, but a few years ago we went through a reorganization in the state of Wisconsin; it was performed under the Kellet Reorganization Bill, and a lot of things were pulled together under a single tent. I'm not so sure this was an improvement. I prefer rifle vision to shotgun vision, and when using a shotgun I certainly don't favor flock shooting. I think a lot of these organizations are flock shooters: whatever comes along--Zap. On the other hand, there's nothing wrong with a lot of the organizations which have a specific purpose. Basically, organizations die by attempting too many things. You know, the centipede has remarkable integration--all those legs working together. I rather doubt that this type of centipede integration is possible in the human machinery.

Q. Nature Conservancy Guidelines mentioned acquisition of land for school use. Do you see this in the near future?

A. Well, it's not happening in Wisconsin yet. It has happened for universities, but not down at the high school level. One of the reasons is that we just haven't got enough money--that's the usual cry--and also, I suppose, higher priorities are put on these other objectives of Nature Conservancy. Certainly land for school use should be acquired. Education doesn't begin in college--at least it better not, it better start a long way down the line.

On the bright side, there's never been a better time to latch on to government monies, at least in Wisconsin. The Orap program provides 75 percent matching Lawcon monies if the Department of Natural Resources approves it. So when you go to school boards and common councils, you begin talking about 25,000 dollars of their money instead of 100,000. I believe Lawcon is now fully funded, so that this is not just a paper deal. What I'm saying is that never before has government money been so readily available as it is at this moment.

Q. What is your feeling about using volunteer help in your community?

A. Well, I use them and abuse them very much. My Dane County Conservation League, for example, has any number of jobs which are just too big for the kids, so I get in volunteer help. At the school forest, the concrete slabs for all the buildings were laid by the fire department. I kind of own the fire department in this town; I know these guys and I just go to them and say I gotta have a slab poured. One thing about a fire department, there are more competent

technicians than in any other collection of men in the world. They all moonlight, of course, and every one of them knows how to do something--there's an electrician, there's a cement finisher, there's a plumber. Furthermore, they're all little boys--they love to make a game of working together. My brother-in-law was mayor of Madison a while back, and he had a fireman's strike. I said, "Otto, what kind of a politician are you? These guys won't work for you for money, but for me they come out and do it for nothing."

Q. How do you go about rewarding the individuals who give you their help?

A. For the firemen, we usually bring out two cases of beer and a large number of bratwurst, and we have a little bust. We never do this until the job is done, though--I've been caught on that. Then you send the charges though the Board of Education budget as "materials and supplies," and the computer doesn't even stutter. (Computers aren't so smart--that's one of the big mistakes of this century.)

Let me give you another bit of advice. I have a huge advantage because I'm on crutches; immediately people are sympathetic to me, and I can limp like hell when I want to. I remember when we were fighting to get access to the Mount Vernon Creek. The farmer with the biggest land holdings there was determined not to have anything to do with us guys. Finally, though, we worked it out with him to let us go to his stream. We took a twenty-year lease on the banks so that we could work in and along the creek. A year or so later we stood on that same bank with this farmer, an expansive old Dutchman, and he put his arm around me and said, "God bless you, Paul." When I see you walking through that marsh with these kids . . . this is great." Get yourself a pair of crutches.

Q. We're trying something in our school district that involves volunteer labor. Would it be worthwhile putting an ad in the newspaper acknowledging all those who helped?

A. That's one way of doing it. I'd rather have a personal letter from the superintendent or from someone in the Department. Really I cherish these things. When people give this kind of effort, they're doing it because they wanted to, but they do like to be appreciated and the ad does call other people's attention to the fact that these men or women did indeed help you.

Q. Would you comment on your role as a newsletter editor?

A. Well, I do think you ought to have your own private propaganda sheet. For the Prairie Chicken Foundation, in its early days when we desperately needed money, I used to issue this quite regularly. It was supposed to be quarterly but it was really occasional. This newsletter was very effective, and we've reached the point where we don't need the money anymore. As a matter of fact, we now have so much Chicken money we don't know what to do with it, and we can't turn the damn faucet off. I can't buy land anymore. One big donor

bawls me out all the time. He said, "The chickens don't dance on the greenbacks in the bank where our money is." This is true, except I haven't been able to find the land.

In the case of the Nature Conservancy, the newsletter is very effective. We try to have at least one article of a technical nature, and then one all-heart, all-guts, save-the-environment article, which I usually write. This is our manner of getting memberships, and typically we distribute around eight thousand a year. Most of the time, we get contributions in five-dollar amounts. But just before Christmas, when the boys are looking through the refrigerator to see what's left over for taxes, then you begin to get some big contributions, which help considerably. A newsletter, I think, is vital to this organization.

For the Dane County Conservation League, it's the same thing. One year we had about fifty members; we put out a newsletter and we were able to bounce it up to two hundred members. How do you sell a sportsman a membership? You run into a guy in a bar and say, "Hey, you ought to belong to this," and he shells out two bucks and he never hears from you again. If he gets a newsletter every month and hears what the club is doing, you probably can get a repeat on his membership. I'd say newsletters are invaluable. They are a drudgery but they're necessary.

Q. Most of the organizations you've mentioned were men's organizations. Have you had any special help from any women's organizations? For example, the League of Women Voters, or the garden clubs?

A. Yes, from the garden clubs. The League of Women Voters has never contributed money, and basically what I want out of you is your money. The garden clubs are a fertile source of money and some of them are fairly good-size contributors. The trouble with most organiations though, is that they've got five hundred or a thousand bucks and with that they'd like to buy an entire area-sometimes do like the Green Tree Garden Club Preserve. Well, a thousand bucks isn't going to do it, it's probably going to take five or ten thousand bucks. Another thing, we are starting to get donations of land and money in people's wills. The most delightful one I know of is from a woman down near Waukesha. She has a really fine piece of land which she wants to give to the Conservancy. I had the University at Milwaukee check it out and it is indeed worthy of their being the eventual recipient. She said, "I'm going to put this in my will. I'm only sixty-three, but don't feel bad, Mr. Olson, I come from a short-lived family." So I thought she was a delight. Well, this represents a problem--many donations are really not big enough to be a separate project. Up in central Wisconsin there's an island which abounds in lady slippers. I think there are nine species growing there--it's really quite an unusual spot. I call this place Memory Gardens because we never got enough money to pay it off totally but when we have a memorial of some sort we tend to assign

it to the island. So gradually over the years I'm sure we'll get this paid off.

Your question was about help from women. Now, as far as the Nature Conservancy is concerned, we couldn't live without Emily, our secretary; we couldn't live without Peg Watrous, our membership chairman; we couldn't live without Gena Kline, who handles our mailing and does most of our talking on the subject. We couldn't live without Ruth Hine, our editor. You get these women going and you have a force which you might call "disciplined violence." I can remember Les Voght telling about the Flambeau River purchase some years back. I believe it was Mrs. Labuddy who finally jammed that thing down the Commission's throat; they weren't a very willing commission at that point. He said that Mrs. Labuddy used to come in the office, point her finger and say, "You are a naughty boy." Well, eventually we got the Flambeau Forest. Another female booster was Mrs. Kohler; this green whitehouse was one of her pet projects. It's not so much a natural area as it is a historic area. I frequently tell the kids, when we are putting fence posts along the creek and using a tractor-powered auger, that that auger is the greatest labor-saving device since the invention of women.

Q. How much of a problem is there arising from things that are willed to you? Do you run into "This property is yours provided is is used for this specific purpose"?

A. Yes. Restrictive covenants -- they can be difficult. We have a standard reverter clause and usually the person is aware of it. "_____ must be used for _____ purpose, unless it must be used for _____purpose, or else it reverts to _____." Typically that gets into the will too, at least if the lawyers call first. I haven't gotten any that were so restrictive we couldn't handle them, but more and more the national organization is touchy on controls. They point out, for example, that around one area which they thought was perfectly wonderful -- they had tax exemption on everything -- the community slowly encompassed it and all of a sudden they got themselves a tax bill, which is an unbearable burden. When you're talking about perpetuity, you know you're talking about an awfully long time, and I can't look that far ahead. I'm sure there are some things that I have done which are going to give trouble in the future. The fact that I did some things right may be enough. In the state of Illinois, I believe, the reverter clause is only good for forty years. So they begin to talk about thirty-eight year leases which are renewable endlessly. There are legal problems, and my tendency is to forget the legal problems and get the land and somehow or other we'll solve the legal problems, because if we didn't get the land we'd lose it anyway. "Cut and get out," I guess is what I would have been a hundred years ago. Fortunately, I wasn't.

THE WORKSHOP IN

RETROSPECT:

A SUMMARY

THE WORKSHOP IN RETROSPECT

The concluding session discussed and summarized outcomes of the workshop. Four participants reviewed the sessions, identifying points of agreement and disagreement, and placed the results of each session into the broader scope of the workshop. The diversity of preparation and professional orientation of the reviewers is, of course, reflected in the analyses. A span of environmental education perspectives from early childhood education to adult education and viewpoints from three different EE agencies are represented. Each reviewer described the "happening" as he saw it, from his personal EE framework.

PLANNING THE ENVIRONMENTAL EDUCATION PROGRAM

David Engleson
Science and Environmental Education Specialist
Wisconsin Department of Public Instruction

My assignment is to talk about environmental planning. We started the workshop talking about environmental planning, and it's appropriate that we end up talking about planning. Dr. Ambry said that one of the things he criticizes about most workshops is that they grind to an end and nothing more is heard. My remarks, I hope, will suggest that this need not be the case with this particular workshop.

Back in the fall of 1969, when I saw the first drafts of Senate and House bills which later became Public Law 91-516, the Environmental Education Act, my immediate reaction was "My God! They're trying to destroy what's existed in Wisconsin for such a long time: the spirit of cooperation among the various agencies and organizations involved in environmental education." It really appeared that this particular act--with provisions for funding fourteen different types of activities, and seemingly making almost anyone eligible for funding--would stimulate a great deal of unhealthy competition among the potential recipients. I could see everyone trying to re-invent the wheel independently of everyone else. I expressed these fears to my colleagues, along with the hope that we would develop some kind of a coordinating mechanism for the State of Wisconsin to avert what seemed to be certain conflict and a race to build domain. Fortunately, a couple months later two things happened to alleviate some of my fears. First of all, Dr. James Allen, then commissioner of the U.S. Office of Education, urged chief state school officers to develop a plan for environmental education. In late February 1970 we had a governor's conference on environmental education and out of that conference came recommendations encouraging cooperative effort among many of these agencies and institutions in the state. Then, the U.S. Office of Education released a publication entitled "A New Role for American Education," which suggested the need not only for state planning, but also for environmental education planning on the regional and national level.

One point that was emphasized in "A New Role for American Education" as well as in a subsequent publication, "Education That Cannot Wait" (also from U.S.O.E.), is that the most desirable approach to environmental education is a whole community approach. Now, you can define a community in almost any way you want to. The city in which you live, the county in which you live, the state, the nation--each is a community, and each ought to have a plan for environmental education.

And this whole community approach should involve not only school people--students, teachers, administrators, librarians--but also people from industry, organizations, agencies, and educational institutions other than elementary and secondary schools. In other words, you ought to have a very broadly based group.

In his working paper, Dr. Ambry gave us some suggestions for state planning. Remember that that paper reflects what they feel is needed in New Jersey. It should be of some help for us in developing similar plans for Wisconsin, but the exact plan for New Jersey will not work in Wisconsin. I'm sure it won't work in your states; each state has to develop its own plan.

Someone in one of the discussion groups was concerned that we begin state planning at the local level. I think that local school districts can't be ignored, nor can the local community. Again, I think a broadly constituted committee or council charged with developing the state plan must have representation from that level. Actually, each of those communities and local school districts has to develop its own plan for environmental education, and of course it ought to coordinate closely with the state plan. So, we have planning needed at a number of levels, all the way from the local community to state, region, and finally the nation--and I wish someday the entire world could do this.

Here are a few steps that you might consider in developing a plan for one of these communities. I would suggest that first you start with an inventory, so you know where you are. Next you decide where you want to go. Now you will know where you stand and where you're going--what you're trying to achieve, of course, is in between. You simply subtract the first--where you are--from where you want to go, and you've got your needs. Now you look at those needs and assign priorities to them; then you determine, within your local community or your state or your region or the nation or the world, which agency, institution, organization, which group or groups can most adequately develop programs to meet those needs. Finally, you'd better get busy and meet them. I hope you don't spend too much time on the earlier part, I hope you get quickly to this last step--get busy and meet your needs. If you don't have action you're not going to succeed.

Earlier planning ventures involved representatives from several agencies sharing common goals. In one instance, representatives from state educational agencies, the natural resource agencies, and the university community from each of several states met to discuss regional educational problems. Such a group can meet periodically to assist each other in development of state plans; to compare those state plans as they develop, and thus determine on a regional basis what the needs are; and then if possible, to develop and cooperate on projects which might have regional implications. If we need a fairly large amount of money, for example, and we know that this is going to have a regional impact, then we ought to cooperate on this

rather than have each of the several states competing for the same funds. Such groups can also exercise leadership in sponsoring conferences such as this one. Conferences could be an integral part of the long-range planning process.

Related Questions and Answers*

Q. I think business is still throwing up a smoke screen, trying to cover up its particular contribution to pollution. What we need is some indication as to what industry is doing--what kind of projects they are working on, what kind of progress they are making. Also, a summary of cost analysis--what it would cost to clean up, what it means to the consumer in taxes or increased wages. Why can't each business put together some kind of a publication so that we know what changes are necessary in our American life style, what the procedures are going to cost?

A. You say, why don't we in business put out some facts and information about pollution problems, pollution abatement, matters of this nature. You know, no matter what we put out, we always get people calling in to say, "This isn't true; there's no way in the world I can even see of saying this is true." Because of the disbelief that people have acquired from all the misinformation--meaning the smoke screen type of information that has been put out in the past--we are in the situation of being distrusted all the way around. Another thing we've run into in my company: if we come out and say we are spending X amount of dollars on research, we have to make that known to the public somehow--through advertising on radio, TV, newspapers--then we run into the criticism: "Why do you bother to spend this money to tell us how you spend, why don't you take that amount of money and put that into research, too." Here's another problem. Let's say that we have come up with some type of information on how much money we're spending, where it's going. Ours being a public utility, this is public information and it can be had on request. But personally I don't see this as being too helpful to either teachers or students. If you're going to start talking about pollution in my industry, for example, then you'll talk about the amount of SO_2 being kicked out of this or that plant. Again, how much is this going to benefit the student?

About cost analysis, I would say that any company that does not analyze the cost of pollution abatement--how much it's going to cost to cut down on whatever has been happening in the past--is really on the wrong trail. I don't see how a company can withstand all the

*Editor's Note: The questions which followed Mr. Engleson's presentation were not necessarily related to "planning." The many questions centered about industry and environmental problems were answered by participants representing industrial firms.

public pressures unless it knows how much it's going to cost to curb pollution. Our company has analyzed it very closely, we're spending a lot of money. I can give you a figure for that too, but I don't know how much that is going to extend your knowledge. Now, where does a company like mine get money for pollution abatement and research? In Minnesota, if any public utility wants to increase its rate, they have to go through the municipal government, and actually it goes to court and we fight about it. If you've looked in on Minnesota in the last six months, I'm sure you're well aware of what's going on. On the other hand, why don't we cut down on our profits? I suppose this is a legitimate question. But you have to look at the people who are responsible; ultimately it's up to the shareholders, because if you don't report any sort of return on their money, they're not going to buy the stock, and I think the company would fold.

Q. I was going to throw in a comment about the shareholders. Recently a meeting was held in Madison, of Madison Gas & Electric. There was quite a large number of stockholders at that meeting who hold substantial blocks of stock. They were suggesting that they would be willing to work with the company, through the stockholders, representatives, and come up with some means whereby the stockholders can absorb some of the cost of major changes in policy.

A. There might be something like this happening in our company, I usually don't try to find out what is going on everywhere. I'd like to throw out one more thing. The people who are running my company are mostly in the older bracket. The top five or so, the ones really running our company, are within four or five years of retirement--that's close to 60. You find here the same situation when you look at a lot of the school boards; you find people who are old-fashioned, who don't understand the problems. These people's growing environment was altogether different from yours, their level of perception is different. This is something that has to be reckoned with. We don't have to accept it as inevitable, but it's kind of true. I talked to some of the teachers here this week who expressed a desire to move to a different school district because they've gotten so tired of knocking their head against their own school board. So there might be some kind of parallel here.

Q. One of the ways that life styles are created and changed is through advertising. Now, the energy industries are major polluters--I mean the electric companies, and the fossil fuels companies. And ironically, as we approach an energy crisis, our energy usage is going up tremendously, and we aren't going to be able to keep this up forever. Doesn't it appear that one of the responsible forms of business behavior would be to cut down on the advertising that promotes increasing units of energy?

A. Speaking for my own company, last June we stopped all promotional advertising, we have not recruited and we don't intend to. So that's one industry that has. Now, let's talk about energy producers--

if you equate that with the generation of electricity, or gas for heating--as a major polluter. I think you're a little wrong there. The statistics show, on a national scale, that such pollution amounts to about 12 percent. Factories making products--making cars you buy--amount to 20 percent, and automobiles run 60 percent.

Q. Tying these environmental controls together with environmental education . . . . One of the things that is being pushed for in many of the states is an inventory of exactly what's being put out by each company. I agree with you that, going from such an inventory to achievable levels in pollution, cost analysis is exactly what it's going to take. If you're looking for a credible way to get this across to the public, couldn't you try sometimes a joint paper between education and industry? Wouldn't that be a way of getting through this credibility gap that exists?

A. I think that's true--provided that education is willing to go along and industry is willing to go along. Now, you made reference to pollution being emitted. In our company, we've got it pinned down to the minutest particle of what we know is going out; it's documented and everything. Maybe some of these data should be made public; there's a way to do it, but then you have to watch your emphasis, again.

I talked to a student body before I came here, it happened to be a group of sixth graders. I asked one of the students, "What can you do that might improve our quality of air?" She said, "I'll paint a bunch of signs and I'll picket industries." And so I asked her, "Well, are you going to ask industry to make the signs before you picket them? And how are you going to get there--by automobile?"

We have a power plant on the St. Croix River, which divides Minnesota and Wisconsin. One of the science teachers in a suburb of Minneapolis was telling her students that the water that comes from this plant and that goes into the river is 200° when it reaches the river. Now, I really wonder how a science student can ever believe that. Even if a plant of that nature ran water directly out of the boiler it would never be 200° by the time it got to the river, two or three hundred feet away. This is the type of information that bugs me when I go out and talk to students. There is a lot of nonfactual information going around.

GUIDELINES FOR ENVIRONMENTAL EDUCATION CURRICULUM DEVELOPMENT

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Analysis of workshop proceedings, discussions, and reports reveals some points of consensus among participants. There are some acceptable guidelines to use in determining whether local or regional programs have an appropriate environmental education focus. According to participants at this workshop, good environmental education programs would exhibit the following basic characteristics:

Process-centered. The debate over content versus process in environmental education development has been resolved in favor of process. By concentrating on process, content is, by no means, excluded. Rather it is considered in a specific context, in a natural way. Process is also favored because content is seen as a means to an end rather than the end in, and of itself. (This implies that content has little value unless it can be used to resolve problems.) Process is also the priority dimension because it develops people resources--a more fruitful EE activity than replacing one kind of curriculum package with another.

Problem focus. A major thrust for an environmental education program is its problem orientation. This focus puts content to be learned in context, giving the problem solver an opportunity to process information. A problem focus recognizes that conceptual knowledge can be analyzed in various ways and utilized to attack many problems.

The problem orientation appears desirable from the standpoint of the environmentalist as well as the learner. Both agree that individuals and societies confront problems. To solve them, people have to acquire as well as learn to process information. No amount of information will help solve problems unless it can be utilized. Thus, a problem focus gives new relevance to educational programs.

Students think schools are "copping out." Communities distrust educational programs. Both these symptoms have the same root cause. Historically, education has not generally had a problem orientation. But today students and parents expect schooling to aid in dealing with life's problems. This is one place where environmental education's problem focus comes in. For example, what a student learns about chemical reactions may aid in understanding water quality programs. What he learns in elementary social studies might help him see the necessity for intergroup communication to influence others. A problem-oriented program thus includes both formal and informal EE activities. And--even more important--it begins to involve the student in the real world.

Attitudes and values important. The affective domain--attitudes, values, beliefs--shares at least equal billing in environmental education with the cognitive domain. Some, in fact, would argue that attitude and values are more important than content in environmental education programs. This argument is supported by environmental education's philosophic orientation towards a way of life rather than a historical collection of knowledge. EE's concern for substance from the past has always been, "How can one use past knowledge to mediate present and future decisions concerned with quality of life and survival?" This approach indicates that we develop content and learn how to process it to deal with problems facing us. Within the affective domain, there are some environmental attitudes and values we wish people to acquire, for example, valuing an ecologically sound environment. However, the major concern in the attitudes and values arena is to assist people in understanding how values are formed, how they affect one's behavior, and how basic values interact differentially in changing situational contexts.

On these three points workshop participants can agree. But frustration was also evident. Conversations, reports, and discussions indicate much of the frustration derived from problems of definition. It is easier to describe what environmental education is not rather than to describe what it is! We can identify characteristics of EE programs acceptable to the majority but we cannot formulate a definition acceptable to everybody. This supports the contention that environmental education is more an educational philosophy than a substantive discipline. In fact, those people who accept environmental education as a philosophy rather than a structured curriculum seemed to be least frustrated at the workshop. They are willing to accept general operational guidelines rather than demanding a highly structured program. This orientation has the flexibility to handle areas of agreement and disagreement. Points of agreement can be incorporated in all program development efforts while disagreements reflect local or regional peculiarities.

Another source of frustration in developing EE program guidelines is the controversy over changing people's attitudes, values, and behaviors. School people find it particularly difficult to accept the school as an agent of social change. While the controversy will persist, those who have difficulty accepting the role of "values educators" must remember that schools, in reality, have always "taught" values in some form or other--the values of obedience and conformity, for example. We engage in values education by all those things we do and don't do. Thus, educational programs are long-range agents for change. But, we produce situations for people to engage in without being able to predict the effects. Our concern is to produce a thinking person, who because he can think for himself, will decide in the future what societal changes should occur. Taking this position alleviates many concerns about the ethics of values education. The change process without prescribing change is environmental education's concern. We

allow people to clarify their values--not impose specific values and attitudes on them. Guidelines for environmental education programs should identify the range of things that could be done without being prescriptive.

Previous comments reflect concerns of educators and environmentalists but what about the student's viewpoint? Another major guideline in EE programs evolves from assuming that the student is capable of structuring much of his curriculum. If students are future decision-makers seeking an ecologically sound environment, they need to participate in making their own decisions, as well as participate in community decisions. Thus, a major environmental education program development guideline involves providing options for students.

Environmental education accepts responsibility for helping the learner develop a philosophy of life. Constant referrals to self-concept indicate that a person with a strong environmental orientation, a concern for the environment and man's future, and a recognition of the interactions between man and the environment, usually has a strong self-concept. He is relatively sure of himself, knows who he is, knows where he wants to go, what he wants to do, and is not afraid of getting some bruises along the way. This person accepts himself as a part of the total environment and seeks a way to live a quality of life within it. Student -oriented, student-developed. curriculums tend to enhance the development of the individual's self-concept. A person with a strong self-concept is most apt to deal with the broad questions of quality environment in addition to the more universal concerns of personal wants.

Those who are familiar with the history of science, particularly the early days of medicine, will recall "Shotgun Therapy." Curriculum development efforts in environmental education seem to be taking a shotgun therapy approach. Many developers have excellent intuition about useful components of an environmental education program, but these pieces aren't interrelated. While we can operate on faith for a period of time, there is a point where an organizational framework to focus activity becomes necessary. The whole is greater than the sum of the parts. We must be about seeking the connections.

Environmental education includes indoor and outdoor activities. We see both as related to something broader in scope, but are not quite certain how they fit into that overall program. Thus, guidelines and organizational policies might be formulated to indicate how respective pieces tie together. Such guidelines would clarify roles for indoor and outdoor activities for school and non-school people, and, in essence, provide a framework for maximizing benefits from the expenditure rather than wasting efforts--as too often happens today.

In formulating EE guidelines, remember that environmental education should last "from the cradle to the grave." This may be more a philosophy than a practice, but it is important to plan and operate from this perspective. For if environmental education activity ever is limited

to a particular level of the curriculum, or for that matter, restricted to the school alone, our efforts are doomed to failure. An EE curriculum must span the years--providing appropriate experiences for the pre-schooler as well as the adult.

Hopefully, the various aspects of environmental education programs will not be fragmented. If our efforts become fragmented, we'll find ourselves in the same old dog-eat-dog business of competing for limited funds that might be more effectively utilized in bringing people together to talk and work than to create situations where they fight over a few dollars. Where extensive competitiveness is promoted, there is reason to believe that funding operations constitute planned activity to negate change.

"Cradle to grave" environmental education activity provides an early opportunity to establish a set of values consistent with an ecologically sound environment. This value framework permits the individual to grow in environmental knowledge so that, ultimately, knowledge-based decisions can produce sound environmental actions.

All these elements of EE curriculum development have implications for the nature and flexibility of a set of guidelines.

Guidelines for environmental education curriculum development must be prepared with some concern for structure. But the strength of the guidelines will lie in the opportunity provided for alternatives. Guidelines for EE curriculum development cannot be prescriptive. They must be constructed to demonstrate a range of alternatives within the broader set of boundary conditions. These alternatives should be oriented toward student activity--particularly activities where students have opportunity to consider consequences, risks, and limitations of actions within a choice-making framework. One alternative included on a regular basis should be that inaction (no solution) is, in fact, a solution. Even as appropriate EE activity provides opportunity to look at several dimensions of an environmental problem, likewise program development guidelines should provide a range of opportunity for examining several dimensions of a problem. Guidelines should encourage studying the interactions and interdependencies with other segments of the environmental education community.

The workshop participants alluded to developing guidelines for EE curriculum development. For example, it is difficult to cope with one's own frustrations. Many of us feel the pressure to become experts in an area we know little about, and those who are exerting the pressure are not willing to provide the necessary time for re-education. Another obstacle was the danger of imposing a rigid structure on guidelines because of administrative mandates or demands. Participants are asking administrators and departments of public instruction to lend support. When issuing guidelines, don't specify exactly what to do or how to do it, but rather assist in conceiving the broader conceptual framework. And also, do not insist on producing tangible materials, for the "production" of people personnel is as important as the production of visible products.

A major concern in formulating guidelines for teacher preparation was an emphasis on how to direct activities outside the laboratory or classroom (as well as inside). Teachers need to be as adept at facilitating learning in the field and the community at large as they usually are in the classroom. Teachers not prepared to conduct field activities and engage in data-gathering, problem-solving situations outside school confines may not be prepared to environmentally educate or, for that matter, to educate at all. Guidelines for teacher preparation need to emphasis process at least as much as content, particularly regarding formation of values and attitudes.

Guidelines also need to redefine the teacher role. Teachers need to look upon themselves as one type of instructional personnel, who participate in one form of educational activity. Teachers need to realize that they contribute only a part of the total educational effort, whether education or environmental education. The educational arena is constantly interacting with activities occurring in the business and industrial community and with environmental activists. It is only in the entire community context that a child "receives" his education. Guidelines for preparing "teachers of environmental education" must require teachers be prepared to work with all others who may perform some educational function.

Related Questions and Answers

Q. Could you briefly evaluate the past week in light of the original goals?

A. The major goal for the workshop was to bring people from our region together to acquire some sense of organization. The two priorities were communication and planning for action. The communication aspect was worked out extremely well. The plan for action--not as well, but it is a good beginning.

The participants for this workshop were selected to represent a broad range of people. Those who had been involved in ecology and environmental education to a large degree, it was hoped, would assume a teaching function for those who were just beginning. By bringing this mix together, I think we've succeeded at the communication level. We'll obtain further feedback on the planning objective when you complete a short evaluation form this morning. After you've been home for about three weeks--when you've had an opportunity to step back from the heat of these sessions and reflect on them from a different perspective--you'll receive another evaluation form. Finally, we'll contact you again around September and see whether our earlier postulations about success still stand.

Q. In some of the work sessions, the frustrations and tensions resulting from difficulty of moving off first base were acute. There are many hang-ups, and I sense that many people do not understand how to get organized, how to get hold of levers, and how to make power

plays--all these tools that need to be developed. This might be an area where we could get more strength and more understanding if we had experienced people to tell us how to develop a power base. This, I thought, was lacking. Could you say whether or not you observe much progress made here in overcoming the frustration of not being able to get a program going?

A. I sense these frustrations and it doesn't surprise me. Frankly, I don't know whether you can train people to translate plans into action. It seems to be a talent that is much derived from experience, having won and lost some battles and wars. Also, I'm not certain whether we can prescribe how to go about it because we don't understand the individual local, state and regional politics. On the other hand, one of the conference aims was to share with others what you've done that has or hasn't worked. While past experience cannot provide definite rules, it can help establish boundary conditions.

Q. Maybe what we're seeking are the larger patterns of successes and failures, so we can progress toward our goals faster. We still stumble around and make many of the same old mistakes, simply because we haven't developed any guidelines which permit us to sponsor actions more effectively. Sure, occasionally we'll still get hung up on personality conflicts and politics, but there are definite action patterns which are effective, and I didn't see them evolving in the workshop.

A. What was not accomplished this week may get going at the state and local levels in weeks to come. We have introduced people to others with similar interests and problems from their own states and maybe out of this interaction will develop some sort of cadre. We purposely selected many participants who had not previously been on the environmental convention circuit. Hopefully, communication channels will be opened up by having brought you people together.

Q. I'd like to add a remark to the subject of frustration. There's a whole area of human interaction lumped under the title "group dynamics"--the relationships that take place between one person and another, the kind of dialogue that exists between one person and a group, the group attitude toward itself, and so on. In the group work sessions that took place here during the afternoons, we had some really spirited discussions, and they exposed a number of difficulties and weaknesses in our attempts to influence people in our respective communities to see the importance of environmental education. At some future conference such as this one, in addition to hearing from experts in environmental education, I think it would be worthwhile to have people with knowledge and skills in group dynamics work with us. It might be of benefit to those who would like to move programs.

One further comment on something you said, You were counseling the state education departments, saying to them that instead of offering mandates and directive from on high, they should be less structured in what they impose on the teacher. Here's a parallel illustration: If you are a high school teacher and you are finding frustration because of structures which are too rigid and you would like to offer more freedom of choice, then you will create options, so that kids can exercise judgements on these choices. This turns out to be a successful way for getting people involved. I would like to submit, then, that we ask the state departments to give us, within the limitations of their capabilities, options for guidelines. But not mandates--I think this is what I object to: the word mandate.

A. Did I say that the states should issue mandates? The only mandate I would want to see a state issue might be stated: "There are only X things you can do in a school curriculum, and not everything that's been can stay forever. At the moment, and for the foreseeable future environment is critical, if not more important than any other aspect of schooling." All should have an environmental education program in their schools tomorrow; there are several alternatives for doing so.

FUTURE DIRECTIONS FOR EE

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The meeting has made many references to interdisciplinary approaches, knowledge, attitudes, how to initiate change in the schools, units to supplement existing curricula, courses with an environmental core, in-service training, preservice training, etc. Since I was unable to be present at all meetings some of my statements may lack credibility. For this I beg your indulgence. With this risk abundantly clear, I'll make a few observations.

1. If we were trying to stimulate interest in environmental education during this week we had the wrong audience. I felt that this audience was like the people in church listening to the minister give a sermon on why people should go to church. This is a very enthusiastic, well informed, sincere body of scholars with concern for the reconstitution of the disintegrated aspects of the environment and maintenance of those parts not yet badly damaged.

2. There were many ideas submitted for consideration and I'm sure, if the frames of reference for each was known, all were effective and good.

3. In discussing environmental education there seemed to be greater emphasis on the ecology of lower animals and on plants than on man and more than the expected emphasis on school camping or outdoor education. There is no doubt that these are part of environmental education. It seemed that there is still difficulty in escaping from the traditional concepts of conservation rather than the expanded concept of environmental education. The credibility of this statement is supported by the many references to trips to bodies of water, swamps, and dumps and the few references to the problems of urban planning, noise pollution, and people pollution.

4. During presentations related to elementary, secondary and college group discussions there was sincere consideration of what has been tried by individuals and groups but there was no reference to differentiating instructional concepts and methods so that each would be apropos to the mental levels of the pupils.

It must be remembered that children in the elementary school are not small secondary or college students. It is suggested that in planning materials of instruction that consideration be given to the developmental level of the child for whom it is intended. Some examples--primary children are unable to comprehend the passage of

extended periods of time, primary children have a very short span of attention, primary children are trying to make their surrounding world of things and people comprehendible to them, etc. Above all, children up to about the 5th grade are unable to deal with abstractions in the form of theories or concepts that include large numbers of facts that accumulate over large periods of time. Their motives are personal in wanting to form friends and to settle into their lives. The middle school child is trying to adjust to a larger social group and to find his place as he moves from the society that depends upon his family and teacher to a life of independent thought and action. He does not plan far ahead. Unfortunately, some secondary school students are very similiar to this. Fortunately secondary school students, despite their continued struggle for independence are able to plan ahead to a degree, and to deal with abstract concepts. These rough observations in no way mean that some phases of environmental management cannot be included. There can be descriptive concepts that relate to the real world of the young child. If the descriptive concept relates to processes outside of the experience of the child, vicarious experiences must be provided. The recycling of glass may be a case in point.

As we do these things and because we are teachers we will not confuse the conditioned responses of the children for "understanding." Also recognize that the culture in which the child is living has a significant influence on his maturity and values.

5. The reference to attitudes similarly is a potential source of delusion for the teacher. It seems that attitudes are not singular traits. Attitudes seem to be composed of at least two factors, beliefs and values. A pupil may believe that something is true or exists and also think it is bad or vice versa. He may also be positive on both the belief and value aspects and behave in a completely inconsistent manner. In spite of the fact that this is also true of adults, it is more true for the preadolescent and adolescent. In working with children, a teacher is always plagued with the tendency to ascribe adult values to children.

Another concern is the need for attitude development with children of age 10-15 years. They do form attitudes, however, these attitudes are not divorced from their lives or those of their friends.

6. As informed teachers we are more than casually aware that most of what is done in schools is the result of popular opinion or more properly, expert opinion rather than as a result of credible research. As I recall some 90% of what is done in teaching science classes is the result of combined visceral feelings. It seems that environmental education is following the same path and for this we should all be embarrassingly sorry. For example--we talked of structured centrally-prepared curricula and at the same time the need to have encounters in a local community. Obviously these two conditions are less than compatible since each community is different and the children of each community are the sum or product of their genetic potential and their environment. Acceptance of these facts makes flexibility a must for any

curriculum plan. If we are advocating the development of materials, I suggest resource units rather than teaching units for teachers.

It is further suggested that the scholars in environmental education more specifically indicate the desired outcomes. These outcomes must be defined in operational terms or in terms of other measurable behaviors so that goals may be precisely established. This would have the further benefit of enabling the practitioners to measure the degree of attainment of the goals. Even in environmental education we will not escape the present "kick" of accountability. Of course the testing of the feasibility of achieving the objectives and the resultant formulation of materials apropos to the kids would be the ultimate goal.

7. There appears to be one more problem we must all overcome; that is, we must prepare teachers so that they are independent of the algorithmic (a sequence or a list of steps that can be taken to solve all problems of a particular type) approach to teaching. This may be the problem of teacher preparation programs, but it is also the responsibility of inservice programs. If this is to be possible, we need much research on how to teach these environmental management concepts, attitudes, appreciations, behaviors, or whatever.

8. With a captive audience one is always amiss if he does not get in a few "licks" concerning what he thinks. To me the philosophy that should guide all instruction including the man or humanistic aspects of all academic disciplines is--the function of education is to help children to grow into healthy adults who improve each day in their abilities to make decisions that place people together--each with an equal and respected value. To do this each man and woman scientist, non-scientist, engineer, non-engineer, politician and non-politician, etc. must accept and be accountable for his actions. The individual, whether youth, adult, must come to see that he is the one making life's choices and not "they" and that this does not mean everyone does his own thing.

An engineering model of decision making found in "The Man Made World" is worthy of consideration. Model--criteria--constraints--optimization. It is also suggested that the MMW really does deal with environmental management decision-making.

If further planning is in order, I suggest:

1. that the objectives in terms of concepts, processes, attitudes, and behaviors be precisely stated. This will help the teachers see where they are going. This may even eliminate the need for resource units or curricula. The subject matter already exists in social studies, science, health , etc. It just needs a different orientation.

2. that the teaching including both materials and facilities recognize the developmental levels of the learners.

3. that the approach in teaching be that of decision making (this requires knowledge and the exercise of judgement based on values).

4. that we stop blaming science and technology for the mess we are in and shift the blame to each individual.

COMMUNITY ENVIRONMENTAL EDUCATION

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Education is the best accepted method in today's society of instituting changes in values and attitudes in environmental education.

The focus of my talk will be the community environmental action programs--action programs involving the entire community.

But before launching into that topic let me offer some more or less random observations. Senator Gaylord Nelson, in a recent statment, said, "The educational process is the best accepted method of instituting changes in values and attitudes in our society." He wrote this in the Dept. of Public Instruction environmental newsletter last December. We've heard this a dozen times but I think we must agree; we have to continue with the educational process in our whole program of environmental education.

Most of us are here for one thing: Money. We say that money's going to correct every ill in the educational program. Of course, that's a lot of baloney; we could double your salary today, your efficiency would go up momentarily in anticipation of that first check, and after that you'd drop right down to the same level of competence or incompetence. Other factors as job satisfaction, recognition and rewards are the criteria for increased efficiency. Money is not the only answer in environmental education or in any other program. I look at the title grants--Title I, Title III, and others. A good 90 pcercent of the programs thus funded died the minute the money was cut off. Barbara Clark talked about Golden Valley, Minnesota, and spoke about their particular program. When their Title III grant terminated, the program expanded and it's bigger and better than ever. Money is not the answer in this area. What I'm saying is that it's an attitude, it's a way of life, it's a commitment and a belief, that brings results in action programs.

This week we've envisioned many programs, we've talked to each other, we've talked about more money, but we still are not down to the crux of the environmental action--What makes it tick, what does not? Public Law 91-516 is not the total answer. It was intended by the Office of Education and others to be a beginning or starting point in environmental education. In some ways I'm very glad to see it's quite small in the beginning. In Chicago, Dr. Lowe mentioned they had about 50 million dollars worth of proposals sitting on their desk, grandoise plans in excess of $15 million at times. These are not going to be the answers unless we have some basic plans statewide and regional.

Dr. Ambry, spoke very eloquently about the New Jersey plan. This took a lot of dollars. New Jersey is a leader in environmental education

and it exports nearly 90 percent of its high school graduates to other states and to private schools to educate them. New Jersey is simply not doing the job in higher education. If they're going to be selected as the outstanding one in environmental education, they must do better than they've done in their past performances. This is my candid opinion of their situation, but let's give them a chance.

Clay Schoenfeld, in his very forthright and honest manner spoke about the problems in Wisconsin. He was a little rough on the State but I believe that his remarks were accurate. We're a long way from settling these particular problems; and again, we're getting the program going without any money. (See Clay Schoenfeld's remarks on the Wisconsin plan for Environmental Education.)

Dr. Pella mentioned, concerning the educational program, some of the mistakes that we have made. Others have been knocking education. Personally, I don't feel the educational program is quite that bad. In fact, I feel that the educational system is ahead of the rest of the government. In kindergarten, pre-school, elementary and through college and university, educators state: "Don't accept a pat answer. Go dig it out, find out the answer for yourself, challenge the establishment, find out and do your original research." Well, we're raising a batch of youngsters, in the colleges and universities, in high schools and elementary schools, that are asking these questions, and we in the establishment simply do not have the answers. And I don't believe that the kids are on the wrong track; I think that the establishment, of which I am a part, simply is not changing its attitudes quite fast enough.

Mike Naylon and Barbara Clark talked about the Golden Valley program. What was the key to their success story? Who did they have on their committee or program? They have the executive editor-publisher of the Minneapolis Tribune, Bauer Hawthorn, to back them. They have court justices and they have officials from the 3M Company on their Advisory Council. Influential people, who can make things happen and they do. These people in Minnesota, and particularly in the Minneapolis-St. Paul area, are involved in the Environmental Science Center. It is a complete community action program and it is working. It's an education program, yes, but they involved key people in their community, sold them on the need for this particular thing, set up the separate foundation, accepted money, and are off and running. Many, many other fine Title III programs simply did not impress the community, the school system and the educator enough to get additional dollars when the program terminated

The man of many hats, Paul Olson, is another who has impressed various groups and agencies. What has he done? A professional educator and currently an elementary school principal he served on a natural resources board--one of the most powerful advisory boards in the state--for six years. The Dane County Conservation League that he mentioned; the largest land-owner in Portage County; Nature Conservancy, with their untold millions; the Prairie Chicken Foundation that he mentioned; the Audubon Society--all have given money because of his influence.

He's very good at getting blood out of turnips and wrestling money out of people. What is it? It's a community action program! It's a success story.

Alan Voelker, Emily Earley, Clay Schoenfeld, and other contact people in each of the states should be credited here in pulling all of you together for this conference. On one point I'll take issue here, again, with Milt Pella, This is the first environmental conference I've ever been to where I didn't know between 50 and 90 percent of the people in the audience. At this conference, I knew about 30 to 35 of the 80 people. The rest of you are new to this particular area, or at least to me, indicating that I don't get around or you don't come to Madison. I think it's real fine to see this; and in relation to the Green Bay conference, we have more classroom activity participation, more people on the firing line, and some rather successful attempts to get new ideas fused into this program. This is good!

LOCAL ACTION PLAN

Now let's get to our main topic. What makes a local organization tick? The first thing is a goal or objective; and it must be one that's attainable. It can be a series of goals--Phase 1, Phase 2, and Phase 3--but you've got to have a clearly defined goal so that the lay citizen, the general public, can perceive what you're attempting.

Secondly, you need personnel, drawn from among key community people that are knowledgeable, respected in this area, and are willing to work. Don't have too many key people, because large groups aren't very efficient. For example, to make a decision in our group--even to have a coffee break or not to have a coffee break--could prove very difficult. When you have two people, as Milt mentioned earlier, you have two problems.

Finally, in any community organization, what is your plan of action? You must have Phase 1, Phase 2, and Phase 3. Once you have your goals, once you have your people, how are you going to get your thing done? You can't ask the general public, you can't ask a committee for a decision. These decisions have to be made before it happens, and they must say, "It will be done this way." Stick to this particular plan and you're off and running.

You must involve people. Everyone has an unsaid sermon that they must say; if you don't give them an opportunity in a local community action like this, they'll start a splinter group for their pet project. So you set up committees--program development committees, publicity committees, arrangement committees, budget committees, and follow-up committees--give everyone a job. These jobs have to have meaning and input into the organization, but if your people are involved, you're going to meld this organization together and go.

A publication by the Conservation Education Association indicated how you should go about contacting public officials, particularly your legislators and alderman. First of all, you must research your program

thoroughly. Know what you want in particular and don't base your appeal on emotions alone, as is done in Save Sylvania, Save the Kickapoo. and Save all these other areas. Write about one single item. Don't complain about air pollution, the SST, the Root River, apathy, abortions and everything else in one letter. Don't be backbiting or cranky; you can show your displeasure in a firm, polite manner, but if it's namecalling or such, the letter is just filed and you'll get this reply back from your senator or assemblyman: "Your letter has been received and its contents noted; thank you very much." And you won't hear anything more from it.

Publicity--here is one thing we can and should do. Contact the newspaper, radio, and television departments that might be concerned in any particular program that you have. Before you start, let them in on the ground floor; don't be cute and pull surprises on the media, because you're only going to alienate them. When you have contact with the news media and have the program rolling, then plan an agenda of some type--prepared copy, highlights of what's going on, back minutes of previous meetings, let interested observers know what the heck you're attempting to do and what has gone on, so they won't think you're hatching something in the dark or in secret. Publicize the dates, of course, and keep a log of the activities and programs that you're doing.

Finally, what is news? What are you going to do to gain publicity? If it's simply a chicken dinner to get people out to impress a few officers of the organization, forget it. The news has got to be current, pertinent to the particular subject, and of interest to the intended audience. The news media is pretty sharp; you pitch them one curve ball, and you're out of the ball game. They're not going to show up or give you any support later on. Long, dull, uninteresting, and unneeded business meetings are atrocious; these things should be handled in committee. Limit yourself to a brief report--we have so much money in the bank account, we're so much in the red--rather than a host of detailed reports. And remember to focus on the correct audience. What audience do you wish to reach? Is it for new members, for new support, is it for a special project, is it fund-raising, or is it a mutual admiration society to pat each other on the back and give each other awards? Too often, some of these organizations get out in left field and they start giving awards in areas far removed from their areas of competence--in religion and politics, and entertainment.

Wisconsin has about 700 conservation groups--fish and game clubs, white-tailed deer clubs, et cetera. These are very important. This group has consistently supported solutions to environmental problems. My entire salary, the entire educational program of the Department of Natural Resources, is supported by these hunters and fishermen. Untold millions in each of our states in Fish and Game Departments come from this particular group. In addition to the 700 Conservation Clubs in Wisconsin, we have about 400 garden clubs, approximately 350 women's clubs, Izaac Walton leagues, the League of Women Voters, the Ecology

clubs--all of these are a portion of the general public that you can work with in your particular school. Most of the other organizations, such as archery, camping, and social clubs, religious groups, political parties, the beekeepers, and all of the animal breeders and dog clubs--almost every one of these now has a conservation or environmental committee, or a person designated to keep abreast in these areas. And one program a year--no matter what their group is, is devoted to the environment. Now here's where we as school people can reach a large segment of the population, and enlist their support.

The entire time that we've been talking about the problems, environmental, education, and so forth; we have the problems or issues identified, we know how to solve them, we have the research people at the University, and so on. But it's the attitudes and values that are crucial--apathy among the general public, and apathy and laziness on the part of the teachers. I still find, working with all groups, that educators are positively the most difficult group to get together at any time other than regular class hours during the day. And I'm chastising you right now, as an educator myself. Teachers feel that the time after 4 o'clock at night and Saturdays is their time, and they'll attend if they get paid or compensatory time off. Most of the other people, particularly those working in the environment will spend a great deal of time in weekend activities. Teachers do not. (I'm speaking primarily of those that I work with in Wisconsin but maybe it's different other places.) If you want community support, you must consider when a particular group meets. Is it a special gathering at noon or in evenings? Do they have weekend meetings? And are you willing to go explain at that time! Sometimes I don't think that we are.

In closing I would like to say that the couple days I spend in my discussion group was very enlightening--to see the various levels of development in the different states, to see some of the problems. I also had a chance to stop by some of the other discussion groups. I picked up all the summaries of the reporters; I thought these were very good and very enlightening. Alan Voelker has indicated there will be proceedings of the Conference, based upon the presentations and your reactions to them. We also will include an evaluation of this particular conference.

Let's extend thanks to the local action groups. Paul Olson made it work, Dick Myshak in Minnesota made it work and Byron Ashbaugh made it work--these are just a few of literally hundreds. Ohio's got a raft of them; Illinois, particularly, has many, many citizen's action groups, and a lack of any strongly identified central organization. Share with these people your problems, your programs, and hand of welcome. The financial support which is sorely needed will be coming, but it will come only to the extent that we change our particular attitudes, our particular goals, and our particular ideals. If a program succeeds or fails, it's because you and I wanted it this way. If we don't like our governor we throw him out of office by the vote. If we don't like a particular activity we go about changing it. And

if our programs fail in our community, it's because you and I as community leaders, the key community leaders, have felt that way.

I would like to close with a little poem I wish to share with you.

Now that earth has had its birthday,
We've all agreed that Man
Has fouled this planet royally
And had better find a plan
To clean up the world we live in,
To accept the bill and foot it.
We're all aware of the mess we're in,
But no one knows where to put it.

Appendix A

WORKSHOP SPONSORS

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